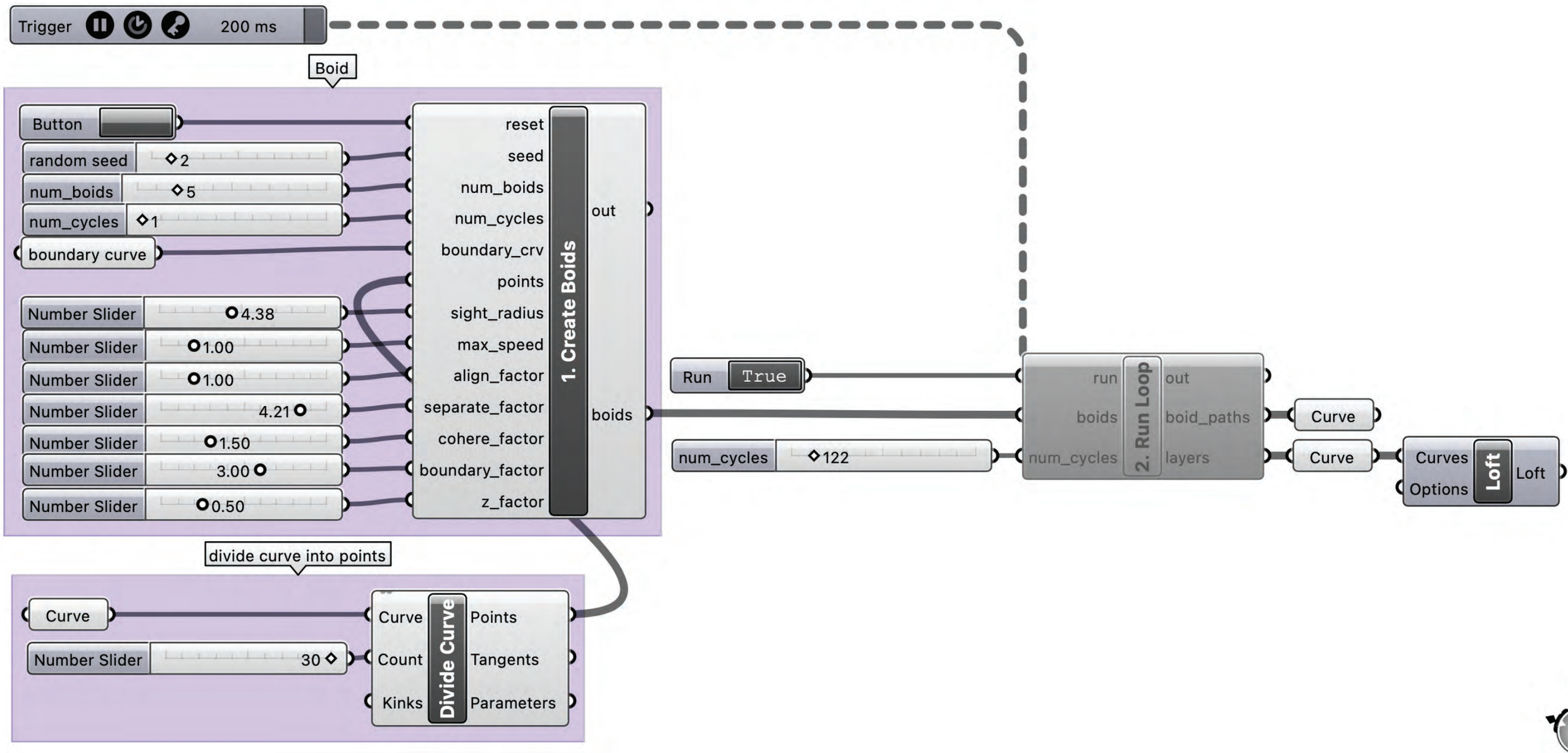
Grasshopper Script



Python Script

```python
#-------------------------------------------------------------------------------------------------------------------#
import Rhino.Geometry as rg
import rhinoscriptsyntax as rs
import random

#=====================================================================================================================#
# 0. These are parameters that weight the different behaviours. Try adjusting them.

#sight_radius = 8 # how far the boid "sees"
#max_speed = .5
#align_factor = 1
#separate_factor = 1.7
#cohere_factor = 1.5
#boundary_factor = 1
#z_factor = 1

#=====================================================================================================================#
# 1. Define the boid Agent class, which contains the methods that make up its movement behaviours

class Agent():
    def __init__(self, init_position, init_velocity):   # this defines the self variables of each instance of the Agent class
        self.position = init_position                   # the current position in space of the boid, as (x,y,z)
        self.velocity = init_velocity                   # a vector showing direction and amount of movement towards next position
        self.trail = [init_position]                    # list of all positions of the boid, starting with the initial

    def move(self):                                     # updates boid position based on heading
        self.position = self.position + self.velocity   # set new position into the self variable
        self.trail.append(self.position)                # add new position into the trail list

    def flock(self, all_boids):                         # flocking movement is made up of three behaviours: alignment, separation, and cohesion
                                                        # we will call each of those methods here to calculate the velocity (heading) of the boid Agent
        other_boids = all_boids[:]                      # the [:] is Python specific, to make sure the two variables' values aren't secretly linked
        other_boids.remove(self)                        # take this boid Agent out of the list
```