Short Documentation (Lab 4)

Farid Guliyev

The source code consists of a total of 4 source codes and 3 headers. Every code is well commented so that you can read the code and understand it. General algorithm is that, first we initialize the leader positions, spline and orientation type as euler angle or quaternions.Then we initialize the boids with positions, random velocities and corresponding id. In the render function, we interpolate the leader with corresponding spline type, and finally animate the other boids. Now let's describe the purpose of each of the source code.

- *main.cpp* - The main function is the heart of the source code that runs the simulation using the help of the other source codes. The user defines the leader and other boid positions, spline type, orientation type in the init function that is located in the main source code.
- *opengl_conf.cpp* - This file responsible for configuring the OpenGL and creating the environment
- *utils.cpp* - This file contains the functions that I use for matrix computation and interpolation. They are the same functions that I have used in other assignments as well.
- *boids_animation.cpp* - This file contains all the functions that have been used to initialize the boids, apply the rules for behavioral motion and animate them.

Here are the detailed information about the animate_boids function:

For each boid, we apply the rules such as "follow the leader", "collision avoidance", "flock centering" and "velocity matching". Each function for the rule returns the corresponding vector. Then we apply these vectors to the velocity with corresponding weight. Weights were found with multiple attempts while testing the motion of boids. Then we calculate the position based on the calculated velocity, and finally we animate each boid as a sphere.