Advanced Homework Assignment
(check lcm.liacs.nl for duedate)

This assignment should only be done by students who have not been assigned a paper to present.

Goal: Increase understanding of animation and character control in OpenGL

No teams allowed. All source code should be written to compile and work on Linux in room 302

The Atlantis demo which is attached was a famous OpenGL demo in the early 2000s. It shows several sea creatures swimming around in a semi-realistic manner. As with all of the homeworks and workshops, you should study and get comfortable with the code before making changes to it.

(1) Basics (low difficulty)

Note that completing "Problem (1) Basics" is sufficient for a pass (grade of 6)

(1a) User viewpoint movement

Add a moveable User viewpoint where i,j,k,l mean move forward, turn left, move backwards, move right and a,z mean move up and move down; and also h which means reset location and orientation of the user.

(1b) Add or Delete Sharks

Everytime you hit the "s" key, a new shark should be added. When you hit the "x" key, the most recently added shark should be removed. Note that if you hit the "s" key 10 times in a row, then it means that 10 sharks should be added.

(1c) Collision Detection and Avoidance

In the current version, all creatures can theoretically overlap (move through each other) because there is no collision detection. Implement collision detection so that they do not move through each other and move to avoid collisions. Note that a simple hitbox (a rectangular box or cylinder around the creature) is sufficient.

(2) Realistic control and animation (medium difficulty)

This will be graded on both functionality (does it do the intended movement) and realism (does it perform the movement in a realistic way including collision avoidance with the other creatures)

(2a) Shark Movement

When a shark gets close to the swimmer, it should realistically change direction to swim at the user and will go through the user position and then continue on.

(2b) Pet Dolphin

Alter the source code so that 5 dolphins are swimming in the scene near the original dolphin. Each time you hit the "f" key, the closest dolphin that is not your pet dolphin will become your pet dolphin. It will first swim over to you and then swim circles around you as you move. This means that you can keep pressing "f" and eventually all of the dolphins will be swimming circles around you. If you hit the "r" button, all dolphins are reset back to their normal behavior.

Submission Checklist

Place in a ZIP file the following and submit on the LML Course Manager zip file where the top level contains a directory called **project.firstname.lastname**. Inside the directory are:
  (1) a file named "**Journal.txt**" which should list
     - Your name and student ID
     - The name of the machine you had it working on. e.g. u0009767, which is listed on the side.
     - Mention which of the problems you solved.
  --> *"make" - Compiling should always be done in this class using "make" (If you received special permission to use a different method, you should mention it here and who you spoke to.)*
  (2) The source code, Makefile and
  (3) Working executable of your solution

Good luck!