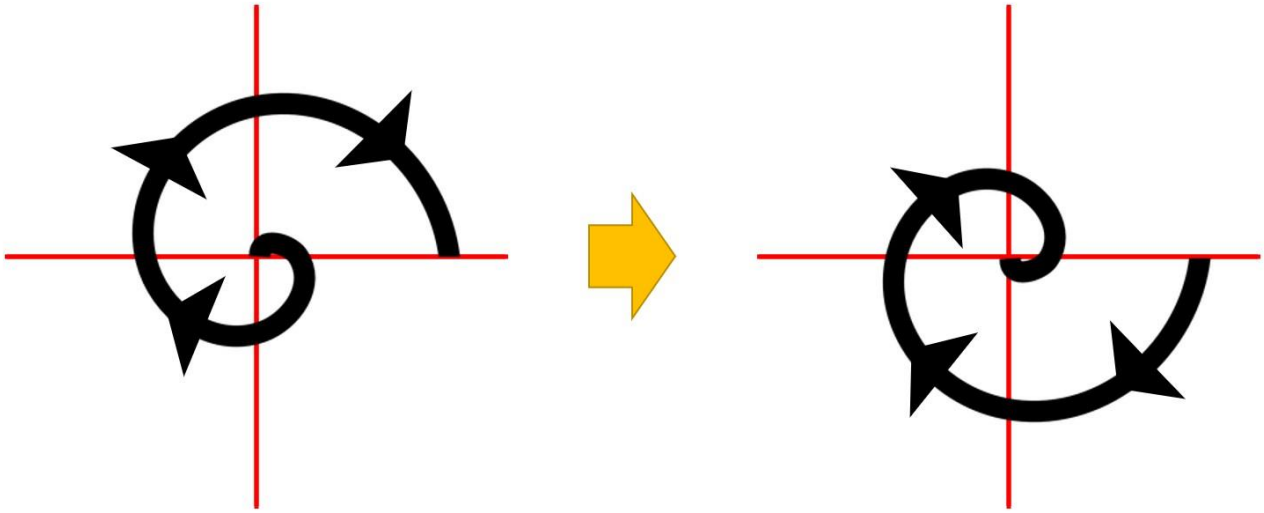
Hacettepe University
Computer Engineering Department
BBM 414 Computer Graphics Lab.
Experiment 3

Subject: OpenGL transformations and basic GUI
Submission Deadline: 17.12.2018 – 23:59
Advisors: Asst. Prof. Ufuk ÇELİKCAN, R. A. Burçak ASAL

Tasks

- Proceeding from the first step of the previous experiment, perform the following requirements:
    - Create a shape (such as in previous experiment) whose center of mass is located on the origin, initially.
        - (25%) Make the shape continuously rotate in counter clockwise direction around the z-axis crossing across its center of mass.
            - Add an interface button to start and stop the rotation.
            - Add 2 other buttons to increase and decrease the speed of the rotation and show the current speed on the interface.
                - Allowed speed interval should be [-10, 10].
        - (25%) Make the shape grow and shrink in size like a beating heart, continuously.
            - Add a button to start and stop the animation.
            - The scaling of the animation should be between 0.5 at its smallest and 1.5 at its largest.
        - (35%) Make the shape continuously rotate in clockwise direction around the global z-axis, as its center of mass follows a spiral path as shown below.
            - Add a button to start and stop the rotation.
            - Add 2 other buttons to increase and decrease the speed of the rotation and show the current speed on the interface.
                - Allowed speed interval should be [-10, 10].
        - (15%) During the animations;
            - The shape must not touch the window edges.
            - The spiral motion must be periodic and clear to observe.



- When restarting a stopped animation, it must resume from where it stopped, not from the beginning.

Notes and Restrictions

- Implement your homework using OpenGL 3.1 version or higher. All programming assignments must use the shader-based functionality of OpenGL: 1) no immediate mode 2) at least one vertex shader and one fragment shader. Therefore, you should not use any of the deprecated features of the API, e.g. glBegin, glEnd, glVertex3f, glTranslate etc. Otherwise the corresponding parts of your homework will not be graded.
- The assignment must be original work. Duplicate or very similar assignments will be regarded as cheating and are both going to be punished. General discussion of the problem is allowed, but do not share answers, algorithms or source codes. Using other resources (example source codes, books, webpages etc.) is allowed as long as they are properly referenced.
- All rules and restrictions stated in the BBM414 syllabus apply.
- Style and appropriately commented code matter.
- For GUI, you can use GLUI (for freeglut) or NanoGUI (for GLFW and GLAD)

Submission

- You should submit entire Visual C++ project directory including source files, header files and the compiled executable in a zip file.
- You should also submit a report explaining your algorithm, description of your functions, and any other implementation details that explain your code. The report constitutes 25% grade of the whole experiment.
- Submission file structure must conform the template given below:
- <student_number>.zip
  |--- project.zip
  |--- report.pdf
- You should upload your files via “Online Experiment Submission System” which is at http://submit.cs.hacettepe.edu.tr
- Do not submit any file via e-mail.
- No submission will be accepted after deadlines.