Hacettepe University
Computer Engineering Department
BBM 414 Computer Graphics Lab.
Experiment 2

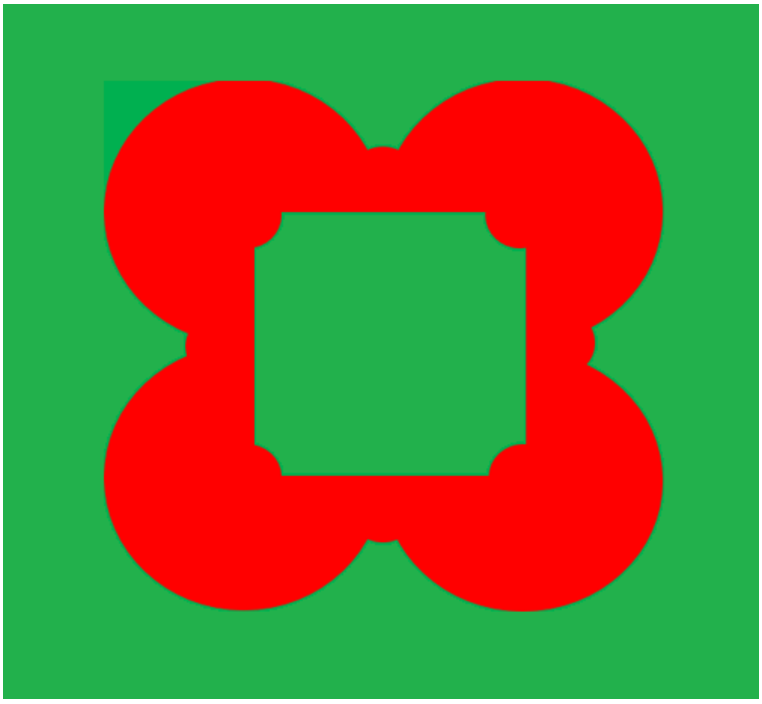
Subject: OpenGL shape drawing and basic shading
Submission Deadline: 03.12.2018 – 23:59
Advisors: Asst. Prof. Ufuk ÇELİKCAN, R. A. Burçak ASAL

Tasks

- Try to complete as many of the following steps as you can.
- To switch between the steps use the following keyboard keys:
  - Use '1' key to switch to Step 1.
  - Use '2' key to switch to Step 2.
  - Use '3' key to switch to Step 3.

Step 1 (20%):

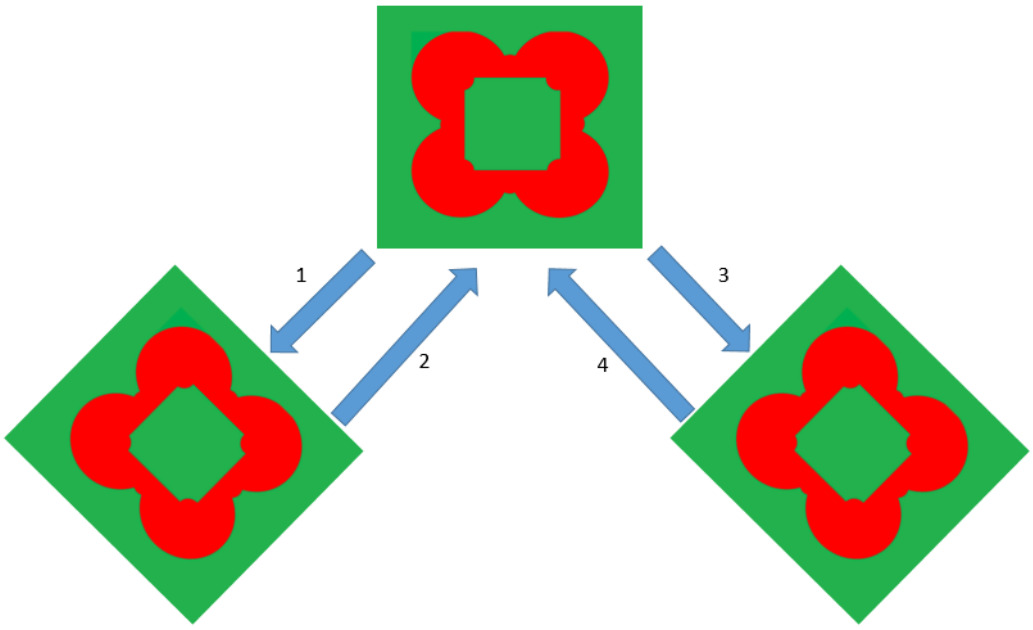
- Scaling the shape from the previous experiment, create the scene given in the following picture:



- Width and height of the shape should be as half of the edge length of the drawing area.

Step 2 (40%):

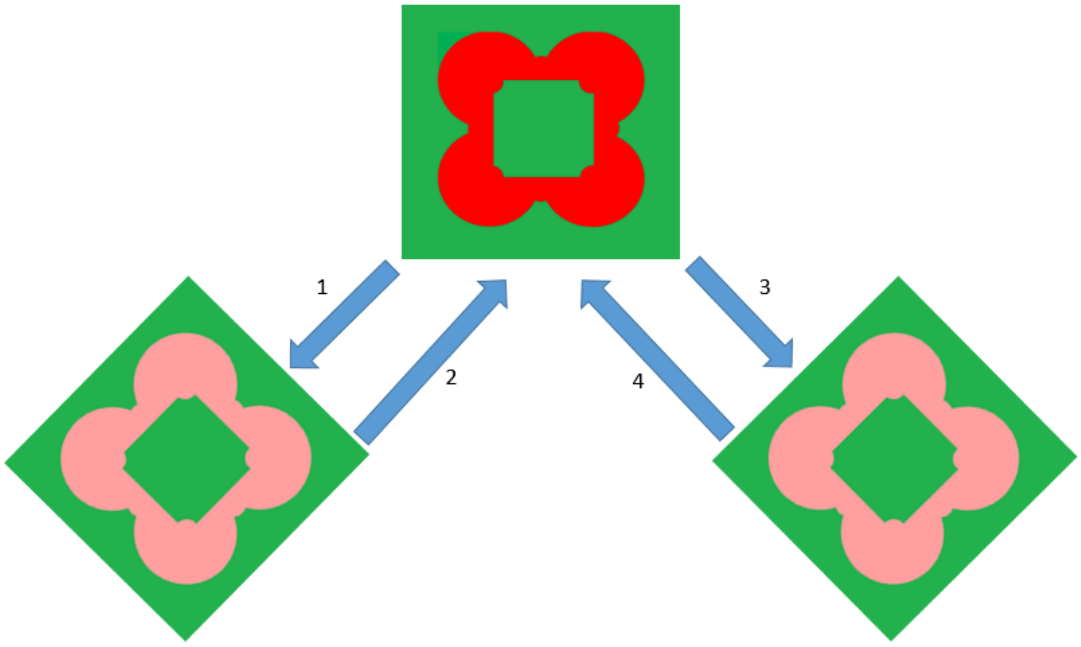
- Change the vertex shader code to create swinging animation given below:



- The shape should not spin around its origin but should rotate [-45, 45]° to perform the swing animation.

Step 3 (40%):

- Change the fragment shader code to degrade the color of the shape according to its rotation as given below:



- The star should have its brightest color when its rotation is -45° and 45° and it should have its darkest color when its rotation is 0°.
- The brightest and darkest colors of your shape should be as similar as possible to the ones given in the figure above.

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.

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.