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

Subject: OpenGL shape drawing and basic shading
Submission Deadline: 11.11.2015 – 23:59
Advisors: Asst. Prof. Ufuk ÇELİKCAN, R. A. Öner BARUT

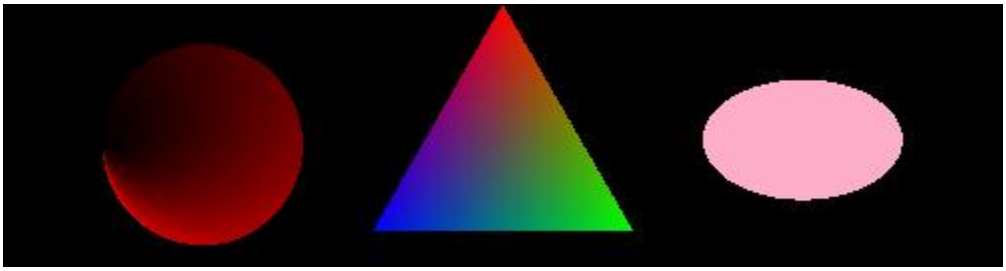
Tasks

Part 1 (40%):

- Download the book source code from the book website: http://www.cs.unm.edu/~angel/BOOK/INTERACTIVE_COMPUTER_GRAPHICS/SIXTH_EDITION/CODE
- Compile the examples from Chapter 2. Run example2 and example4b.
- Take snapshots of what you get from those programs (take the snapshot of entire desktop instead of the program window alone).

Part 2 (60%):

- With the help of the given lab code, create the following picture:



- Grading of the second part:
  - the ellipse: 10%, the triangle: 25%, the circle: 25%

Hints

- Use the variables "vPosition" and "vColor" to pass the vertex and color information to the vertex shader.
- The shapes should be drawn as GL_TRIANGLES or GL_TRIANGLE_FAN or GL_TRIANGLE_STRIP s.

The Circle:

- Use the parametric equation of a circle to create multiple vertexes in a polygon. The parametric equations is:
  y=sin(angle)
  x=cos(angle)
- You will need to increment the angle between 0 and 2*pi to draw the circle.
- You can scale and move the circle by multiplying the coordinates and adding offsets to them.
- Vary the red color as a function of angle to get the shading effect.

The Ellipse:

- For the ellipse, use the same equation but scale the y down to 60%.

The Triangle:

- It's a good idea to use angle to draw the points here too.

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 in Part 2. The report constitutes 25% grade of each corresponding section (e.g. The Report on Part 2 Section 1 is 20% * 25% = 5% of the whole experiment grade).
- 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.