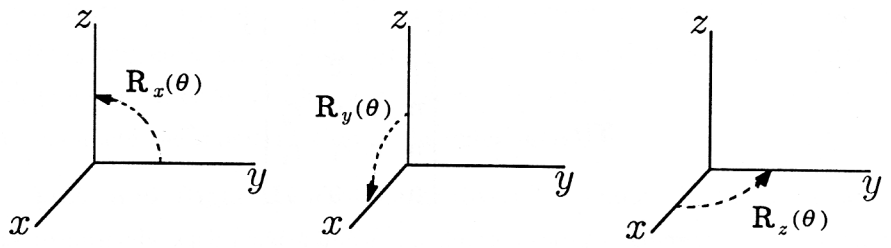
CSCI 2408, Computer Graphics
Assignment 1 (15.06.2019)

This assignment contains two tasks, each giving you 50 percent of the total. Procedure for submitting solutions will be announced shortly. Make sure that you read contents of the task carefully. If the task should be solved using pen and paper, make sure that you deliver a PDF document containing your solution (can also be a scanned copy of the solution). Otherwise, submit your complete project, and also put a screenshot (or several of them) showing how the program executes on your machine. Also make sure, that your code is neat, clean and thoroughly commented. Try to use meaningful variable names. All your deliverables should be packed into a single ZIP archive, with a its name being a combination of your name and assignment number.
Example: **FaridAhmadov_HW1.zip**.

Deadline: 20.06.2019

1 Transformation

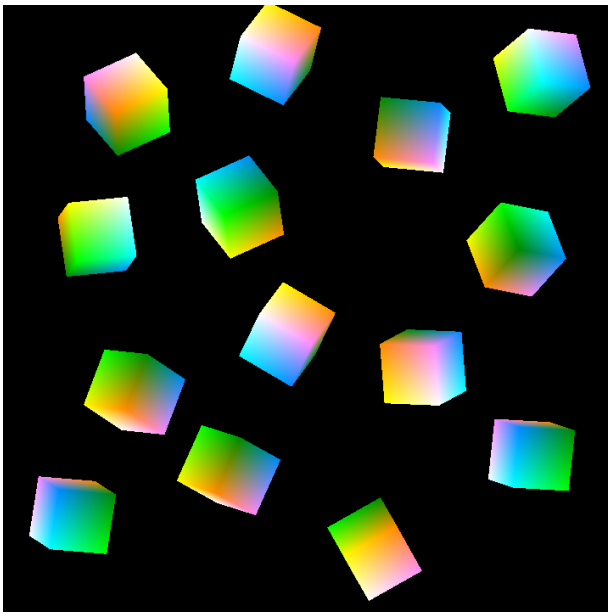


Given a point $P = (8, 4, 4)$ in 3D space, apply following transformations:

- Rotate the point 30 degrees around Z axis;
- Then rotate the point 45 degrees around Y axis;
- Then translate this point by a vector $(5, -8, 0)$.

Locate the new position of the point P, use transformation matrices using Euler angles to do this, by describing each step separately. Also, describe same transformation with quaternions.

2 Rotating Triangles



Create an animation of a set of differently rotating cubes, similar to what is depicted on the left. Use GLUT functions to add interaction to your application: by clicking arbitrary spot on the screen, a new rotating cube should appear.

Hint: create a single cube, load it into the buffer, then use the same cube with different transformations to create an effect of many cubes. A transformation in this case is going to be a combination of scaling $S_x S_y S_z$, a translation and general rotation around X (RotateX(α)), Y (RotateY(β)) and Z (RotateZ(γ)) axes. Use this transformation matrix in the vertex shader to transform your triangles.

Your deliverable ZIP package should contain source codes of the project and also a screenshot of the working executable, that demonstrates how your application works.