COMP3011/GRA53 – Computer Graphics

Assignment 1

**Group representative:** [first name, last name, username]

**Group members:** [list of first name, last name, username]

1. Yunjie Bai psxyb6
2. Wentao Yang
3. Xinyu Chang
4. Kai Wey Lim hfykl2

**Contributions:**

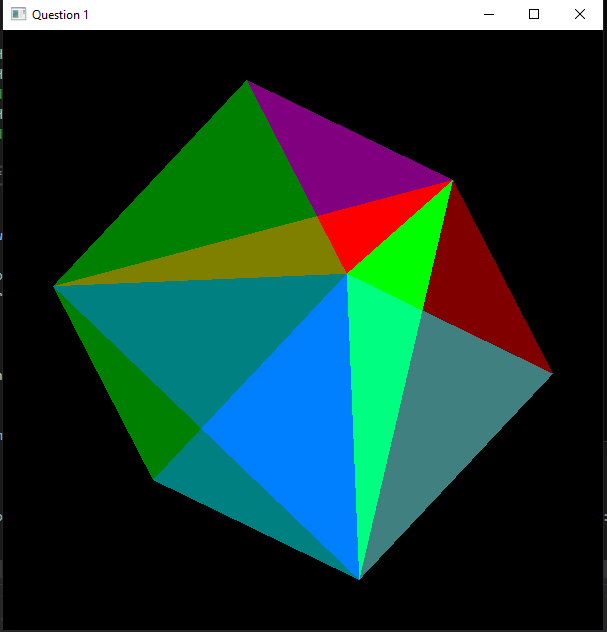
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| --- | --- |
| **Question 1** | Kai Wey Lim and Yunjie Bai |
| **Question 2** | Yunjie Bai and Kai Wey Lim |
| **Question 3** | Yunjie Bai and Kai Wey Lim |

# Question 1 – Modelling

**Contributors:**

Kai Wey Lim: Created the cube and tetrahedron with gl\_Triangles and different colors with rotation.

Yunjie Bai: Tested the code and modified slightly.



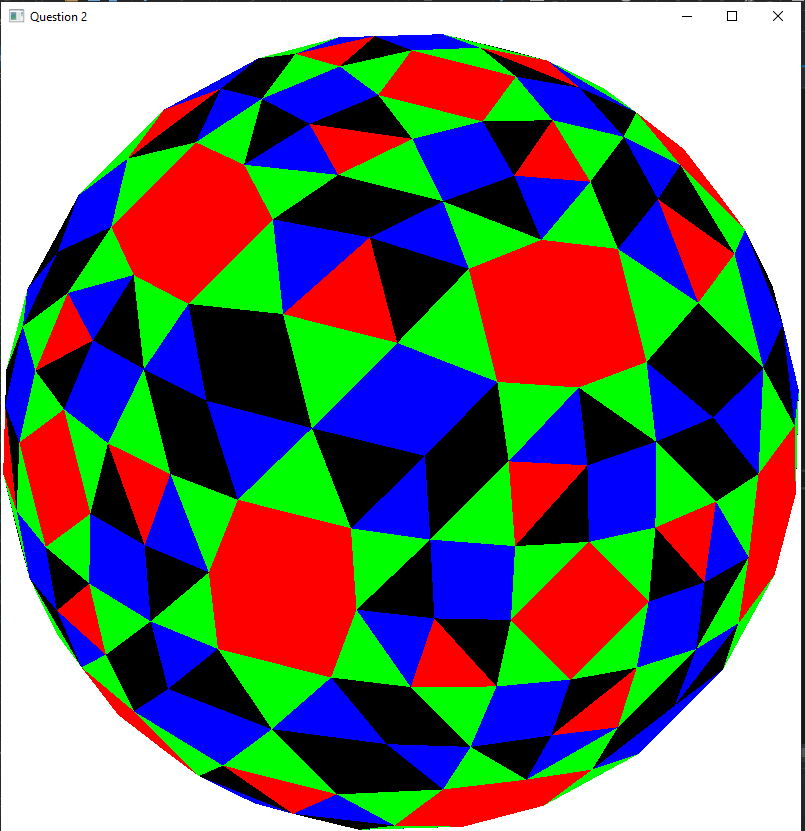
Each face of the cube was drawn with 2 triangles while the tetrahedron has 1 triangle on each face. Once a vertex of the cube is selected, the tetrahedron was drawn accordingly to the vertex. Each face of the cube and tetrahedron has different colour for better illustration.

# Question 2 – Surface subdivision

**Contributors:**

Yunjie Bai: Realize the preliminary graphic subdivision code, the graphic rotation setting and carried out preliminary triangles color transformation.

Kai Wey Lim: Simplify the graphics subdivision code and process the color change code together.



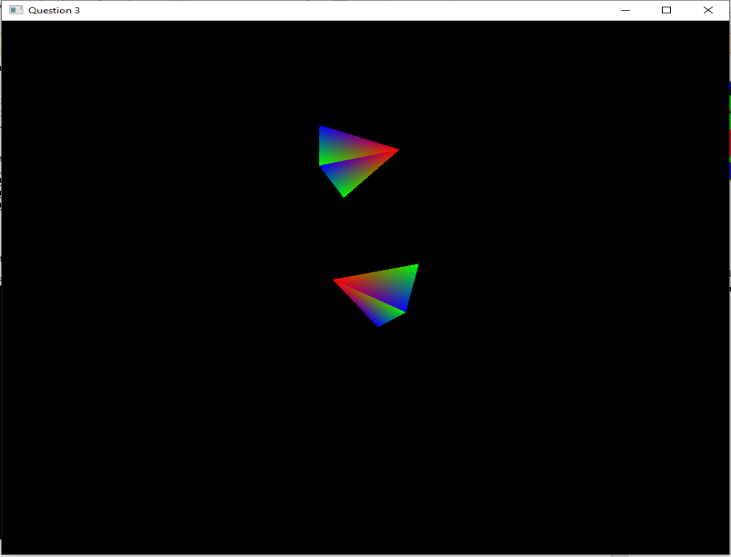
An octahedron was firstly constructed with eight triangles. After obtaining the coordinates of each triangle, the coordinates for each face are fed into a recursive function that will calculate the midpoint of each traingle’s vertices. Normalization is then carried out on the midpoints to push out the ‘4 th’ triangle. The recursion is then repeated based on the specified subdivision level. Each faces are also labelled to allocate their own color respectively.

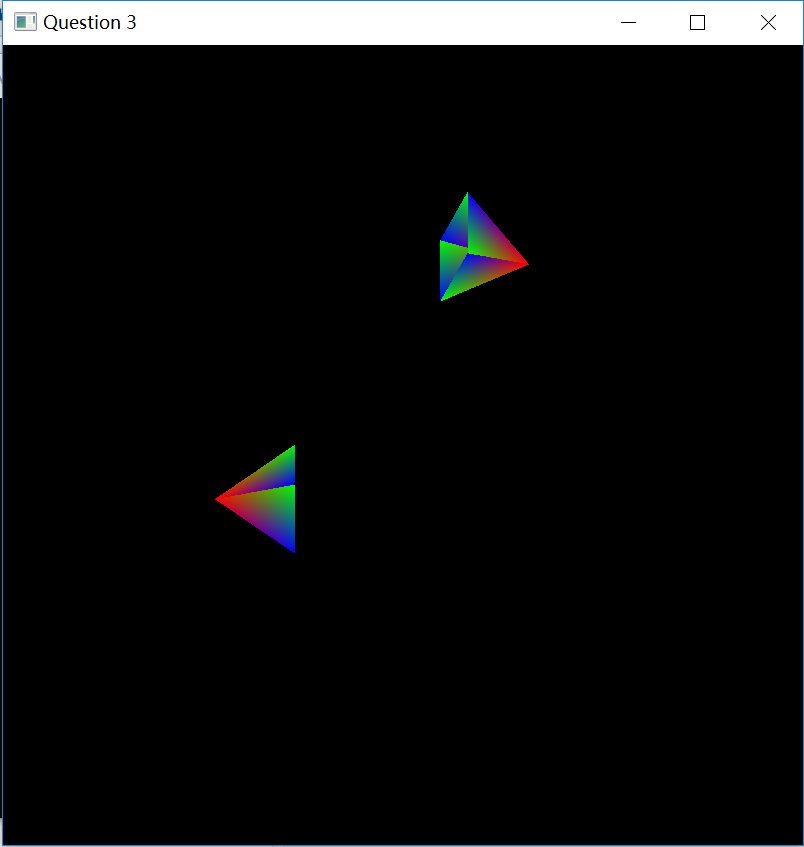
# Question 3 – Transformation

**Contributors:**

Yunjie Bai: Designed the code, moving, rotating, and keyboard control of the aircraft model and added a second airplane model, controlled by different buttons.

Kai Wey Lim: Test the code and made suggestions.





The red vertex is the head of the aircraft. The keyboard can control the direction and movement of the aircraft. The control keys of the two aircraft will not affect each other.

'F' & 'H' Move forward

'Q' & 'U' Rotate by angle clockwise around z-axis (yaw).

'E' & 'O' Rotate by angle counter-clockwise around z-axis (yaw).

'W' & 'I' Rotate by angle clockwise around x-axis (pitch).

'S' & 'K' Rotate by angle counter-clockwise around x-axis (pitch).

'A' & 'J' Rotate by angle clockwise around y-axis (roll).

'D' & 'L' Rotate by angle counter-clockwise around y-axis (roll).

'SPACE' Reset both ‘P1’ & ‘P2’ to start position. (do not overlap)