Assignment 1:

Manual Transformation Projection Matrix

A) Orthographic Projection

-We need to implement Orthographic Projection on White Triangle using Manual Transformations as done earlier for Model View Matrix.

-We will be needing GLfloat arrays of 16 members to represent the 4x4 Matrices.

-Apart from identity Matrix, we will need orthographic Matrix

-Do manual orthographic projection without using glOrtho() for the triangle using GLfloat array as matrix with glMultMatrixf() and glLoadMatrixf().

-Inside initialize() set up the identityMatrix and orthographicMatrix.

-Reinitialize values of orthographic matrix inside resize() with proper values as we do glOrtho(left ,right ,bottom ,top ,near , far);

B) Perspective Projection : Do same for perspective triangle assignment

Assignment 2: Multi-Viewport

-Use Perspective White Triangle with Blue clearColor as a base code.

-On the startup perspective triangle should be visible and as per following numeric key press output will change:

Keypress 1: Triangle will be visible in Quadrant III or Lower Left Corner.

Keypress 2: Triangle will be visible in Quadrant IV or Lower Right Corner.

Keypress 3: Triangle will be visible in Quadrant I or Top Right Corner.

Keypress 4: Triangle will be visible in Quadrant II or Top Left Corner.

Keypress 5: Triangle will be visible in the Bottom Half of Screen i.e area formed by Quadrant III and IV.

Keypress 6: Triangle will be visible in the Upper Half of Screen i.e area formed by Quadrant I and II.

Keypress 7: Triangle will be visible in the Left Half of Screen i.e area formed by Quadrant II and III.

Keypress 8: Triangle will be visible in the Right Half of Screen i.e area formed by Quadrant I and IV.

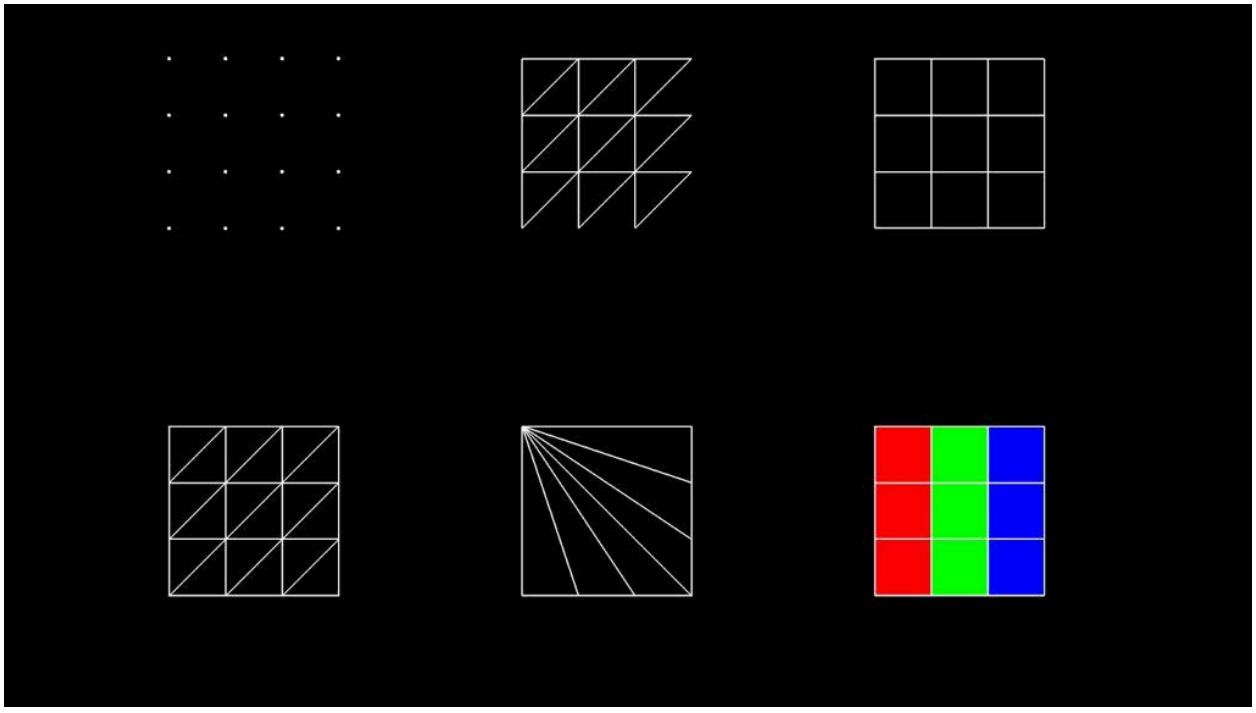
Keypress 9: Triangle will be visible in Centrally i.e in the viewport of Center.

Keypress 0: Reset to Default.

-To do this using changing the viewport of our scene at Runtime.

(Hint?: You need to call glViewport() for 9 different cases and send its parameters accordingly)

Assignment 3: Pattern (रांगोळी)



Assignment 4: Camera Rotating About Y-Axis ("Cube Is Camera")

-We need to simulate the circular movement of a Camera (i.e small Cube) rotating around a Pyramid using gluLookAt().

-Use the base code of ‘Two Colored 3D Shapes’ and set up its placement as below:

1. Stop Pyramid Animation and place it in Center with 45 degrees rotated at Y-Axis.
2. Use approx -12.0f of Z translation for Pyramid position to give space for our cube’s circular movement.
3. Stop all previous rotation of the Cube and scale down the cube to show a smaller cube.

Animation will be as below:

-Cube will move (Revolve) around the pyramid in a circular motion around the Y-axis in a way so that ONLY ONE FACE of Cube will Face the Pyramid always.

-Use 12.0f for Radius of circular motion.

-translate the cube by -5.0f at the Z-axis.

-We will be calling gluLookAt() **before** glTranslatef() and glScalef() where the first three parameters of gluLookAt() will be recalculated to revolve the CUBE in the X-Z plane as if a Camera is Facing towards Pyramid and is Revolving Around our Pyramid.

8 Assignments from HPP Seminar

CUDA:

1.Hello CUDA

2. Vector Addition using CUDA

3. Matrix Multiplication using CUDA

4. Device Properties using CUDA

OpenCL:

1.Hello OpenCL

2. Vector Addition using OpenCL

3. Matrix Multiplication using OpenCL

4. Device Properties using OpenCL

16 Bulk Assignments

Assignment 1:

- Center ला एक point असेल.
- Yellow color for point and other background black
- It should be visibly big enough.

Assignment 2:

- Horizontally Centered line dividing the screen
- Red color line and having visibly thick width
- This is the x-axis from -ve to +ve.

Assignment 3:

- Vertically Centered line dividing the screen
- Green color line and having the same thickness as the red line.
- This is the y-axis from -ve to +ve y.

Assignment 4:

- Use base code of assignment 2 i.e x-axis
- Draw 20 horizontal lines above and 20 below the red x-axis
- Color will be blue and will have less width than the red line.
- Each 5th blue line should be thicker than other lines so that output resembles a graph paper.

Assignment 5:

- Use base code of assignment 3 i.e y-axis
- Draw 20 vertical lines to the left and 20 to the right the green y-axis
- Color will be blue and less width than green line (same as horizontal blue lines)
- Each 5th blue line should be thicker than other lines so that output resembles a graph paper.

Assignment 6:

- This will be the combination of assignment 4 and assignment 5. (graph paper)

Assignment 7:

- Use assignment 6 as base code and draw a hollow triangle at the center.
- Color yellow. Thickness should be the same as blue lines.

Assignment 8:

- Use assignment 6 as base code and draw a hollow square at the center.
- Color yellow. Thickness should be the same as blue lines.

Assignment 9:

- Use assignment 6 as base code and draw a hollow circle at the center.
- Color yellow. Thickness should be the same as blue lines.

Assignment 10:

- Combination of assignment 6 (graph paper) + assignment 7 + assignment 8 + assignment 9.
- On startup no output is visible.
- Triangle, square and circle will be visible on toggle keys of ‘t’,’s’,’c’ respectively.
- Key ‘g’ will toggle graph paper.
- Key press Zero will clear all output.

Assignment 11:

- Draw kundali blank shape.
- Orange color for lines (on black background as before)
- Thickness should be same as red line in assignment 2

Assignment 12:

- 10 concentric hollow triangles.
- Having multiple colors in the following sequence r, g, b, c, m, y, white, purple, grey, orange.

Assignment 13:

- 10 concentric hollow squares.
- Having multiple colors in the following sequence r, g, b, c, m, y, white, purple, grey, orange.

Assignment 14:

- 10 concentric hollow circles.
- Having multiple colors in the following sequence r, g, b, c, m, y, white, purple, grey, orange.
- Hint : two ways we can draw a circle, either by GL_POINTS or using GL_LINE_LOOP

Assignment 15:

- Draw a big hollow triangle at the center.
- Draw a circle inside the triangle.
- Vertical line perpendicular draw from apex of triangle to the base of triangle. (this is static deathly hallows)
- Color yellowish gold/yellow.

Assignment 16:

- Dynamic deathly hallows assignment.
- Three objects will come from different sides but “one at a time” and will settle at their place in the center of the screen.
- Triangle will animate (movement and spin rotation) from the outside of the screen from the left bottom side.
- Circle will animate (movement and spin rotation) from the outside of the screen from the right bottom side.
- Similarly the vertical line will come from the top side.
- Circle will come after the animation for the triangle has finished i.e. after the triangle is at its final position which is the center of the screen. Similarly the vertical line will come after the circle animation is finished. i.e. after the circle is at its final position which is the center of the screen and inside the triangle.
- All three objects should never stop spinning.
- All three have the same color.
- Use PlaySound() for music which should start playing with an application.

(optional: once deathly hallows forms music should give a slight punch)

Static BHARAT:

-All Letters created using OpenGL Primitives and should be in Upper Case.

-Vertices should have Colors like Tricolor Flag and should use correct RGB values for Saffron and Green from Wikipedia.

-There should be Interpolation of Colors between Orange-White and White-Green.

Dynamic BHARAT:

-All Letters created using OpenGL Primitives and should be in Upper Case.

-All letters will be in Grey Color at start.

-Letters will have translation as below from outside of the screen to its original placement.

B: Left to Right movement to center.

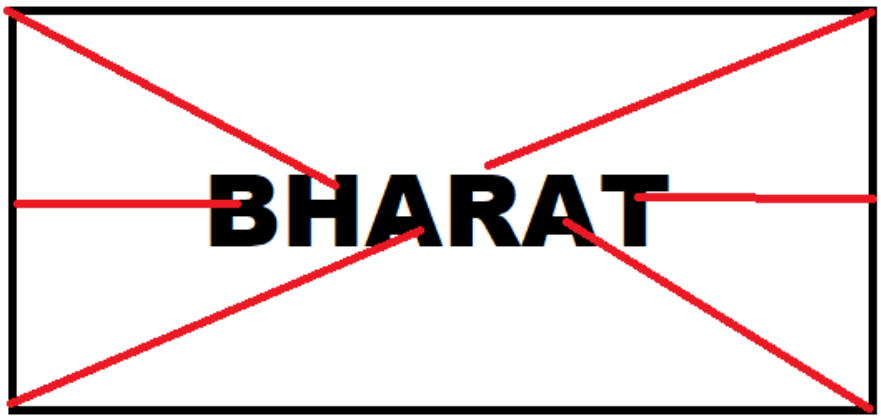
H: Left Top corner to center.

A: Left Bottom corner to center.

R: Right Top corner to center.

A: Right Bottom corner to center.

T: Right to Left movement to center.



-Once all letters have settled at their place three planes will come from left side of screen with animation as below:

1. Middle plane will come from the Left and towards the Right end and follow the Horizontal line in the middle of Letters.

2. Top plane will come from the Top Left corner of the screen in a **Curve movement** , and will merge with the Middle plane and follow the Horizontal Path in Middle of BHARAT.

3. Bottom plane will come from the Bottom Left corner of the screen in **Curve movement**, will merge with the Middle plane and follow the Horizontal path.

4. After flying over the letter ‘T’, Top and bottom plane will follow the Curve movement towards Right Top and Right Bottom Respectively.

5. Once the planes pass over each letter, a Tricolor quad will Fade In in Middle of the Letter using Blending.

Rules for Plane:

-All 3 planes must be of the same Shape drawn using primitives and will have Bluish,Grey etc. metallic colors like fighter planes.
-Planes will have a small IAF Insignia/Logo of circular shape. (Concentric circle of Orange,White,Green Color)
-The Tail of planes will show Flame of Orange,White,Green for Top,Middle,Bottom planes respectively.