

Name Surname:

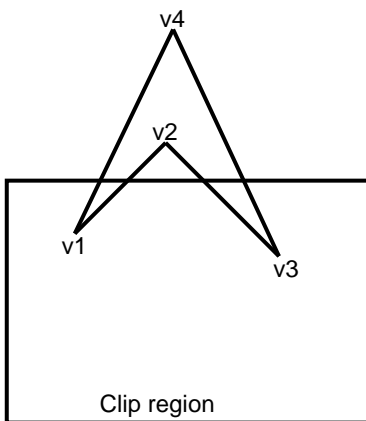
Q1. [16] How can you model a cup like the one shown below using constructive solid geometry? You can use simple primitives such as a sphere, cylinder, cone, torus, box (cube). Describe your construction with details of the operations on the primitives. Draw a labeled binary tree to illustrate the processing of the primitives (leaf nodes) to create the final object (root node).



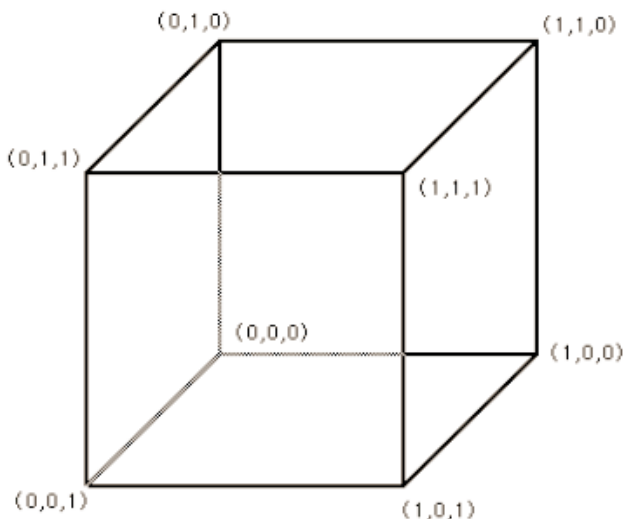
Q2. [17] A line is given with endpoints (2,3) and (8,7). Determine the pixels for drawing this line using Bresenham's algorithm. Show your decision parameter at each step clearly.

Q3. [17] Calculate and write the transformation matrix for rotating the ABCD parallelogram with vertices A(1,2), B(4,5), C(5,8), D(2,5) 45° counter-clockwise.

Q4. [16] For following polygon in the clip region, apply Weiler-Atherton polygon clipping algorithm.



Q5. [17] Calculate the intensity of the vertex at (1, 1, 1) by using the basic (Phong) illumination model. $V=(0,0,1)$, $I_L=0.8$, $K_a=0.1$, $K_d=0.5$, $K_s=0.2$, $n_s=1$, $I_a=0.5$, $L=(0.71,0,0.71)$. Assume that all the normals of the cube's sides are facing outwards, i.e., away from the cube.



Q6. [17] Write the OpenGL program that draws a filled triangle on screen with all three corners in different color.