Department of Computer Science and Engineering

Couse Name: Computer Graphics Lab

2. Filling and Clipping:

Filling: To study and Implement Polygon Filling: Implement polygon filling algorithms discussed in class for a single surface a) using Boundary Filling Algorithm (4 and 8 connected) and b) Scan line polygon filling approach.

Your program should accept a polygon as a list of vertices in counterclockwise direction and then fill it with a fill color using the above techniques taught in class. The program must be able to handle convex polygons.

Clipping: To study and Implement Line Clipping with Cohen-Sutherland Algorithm. Implement the Liang-Barsky Algorithm and Parametric clipping algorithm in the same manner for clipping a line. Study and implement polygon clipping algorithm using Sutherland – Hodgeman algorithm.

You have to design a program which will take input the coordinates of two end points of a line and two window coordinates. Then you have to draw the line and clipped window.

Like,
Enter Minimum window co-ordinates:- 200 250 Enter Maximum window co-ordinates:- 300 350 Enter co-ordinates of first point of line: - 180 250

Enter co-ordinates of second point of line: - 200 300

The Cohen-Sutherland algorithm uses a divide-and-conquer strategy. The line segment's endpoints are tested to see if the line can be trivially

accepted or rejected. If the line cannot be trivially accepted or rejected, an intersection of the line with a window edge is determined and the trivial reject/accept test is repeated. This process is continued until the line is accepted.

To perform the trivial acceptance and rejection tests, we extend the edges of the window to divide the plane of the window into the nine regions. Each end point of the line segment is then assigned the code of the region in which it lies.

Assessment

Your overall programming assignment grade will be based on the following: Does your fillPolygon routine fill rectangles and triangles and both concave and convex polygons properly; regardless of order of entry of vertices.

Does your clipping algorithm perform trivial acceptance and rejection tests? You should be able to explain the efficiency of the clipping algorithms and also be able to explain why Sutherland- Hodgeman algorithm works only for convex clipping regions?