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OF INFORMATION TECHNOLOGY

Short Questions with answers

Assignment no 5

Sutherland-Hodgeman Polygon Clipping

Q1] what is polygon clipping.

Polygon clipping is a process in which we only consider the part which is inside the view pane or window. We will remove or clip the part that is outside the window.

Q2] How many polygons are used in Cohen- Sutherland method?

Two polygons are used in this algorithm namely clip polygon and subject polygon.

Q3] what is cohen-Hodgeman polygon clipping algorithm?

It is performed by processing the boundary of polygon against each window corneror edge. First of all entire polygon is clipped against one edge, then resulting polygon is considered, then the polygon is considered against the second edge, so on for all four edges.

Q4] How can polygons be clipped?

A polygon can also be clipped by specifying the clipping window. Sutherland Hodgeman polygon clipping algorithm is used for polygon clipping. In this algorithm, all the vertices of the polygon are clipped against each edge of the clipping window.

Q5] How cohen Sutherland algorithm works .Difference between Cohen Sutherland and Sutherland Hodgman.

Cohen Sutherland and Sutherland Hodgman clipping algorithm:

The 'Cohen - Sutherland' algorithm is a method used for 'line clipping' computer graphics. The Polygon Clipping algorithm from Sutherland-Hodgeman is operated by handling the polygon boundary opposite to each window corner or side.

Q6] what are the types of clipping.

Types of Clipping:

- Point Clipping.
- Line Clipping.
- Area Clipping (Polygon)
- Curve Clipping.
- Text Clipping.
- Exterior Clipping.

Q7] what are advantages of Cohen Sutherland Line Clipping

Advantage of Cohen Sutherland Line Clipping:

- It calculates end-points very quickly and rejects and accepts lines quickly.
- It can clip pictures much large than screen size.

Q8] what is region code in Sutherland cohen Line Clipping

Cohen Sutherland uses region code to clip a portion of the line which is not presentin the visible region. It divides a region into 9 columns based on (X_MAX,Y_MAX) and (X_MIN,Y_MIN). The central part is viewing region or window, all the lines which lie within this region are completely visible.

10. What is the significance of the winding number in the Sutherland-Hodgman algorithm?
- Answer: The winding number helps determine whether a vertex is inside or outside the clipping region.

11. How does the Sutherland-Hodgman algorithm handle polygons completely outside the clipping window?
- Answer: It discards polygons completely outside the clipping window.

12. What is the role of the "inside" test in the Sutherland-Hodgman algorithm?
- Answer: The "inside" test checks whether a vertex is inside the clipping region, aiding in determining which portions of the polygon to keep.

13. Explain the concept of the intersection point in the Sutherland-Hodgman algorithm.
- Answer: Intersection points are calculated where the polygon edges intersect with the clipping window boundaries.

14. How does the Sutherland-Hodgman algorithm handle degenerate cases, such as a polygon entirely outside the clipping window?
- Answer: The algorithm efficiently identifies and discards degenerate cases.

15. Can the Sutherland-Hodgman algorithm be applied to 3D polygons?
- Answer: The Sutherland-Hodgman algorithm is designed for 2D polygons and may need modification for use in 3D.

16. What are the advantages of the Sutherland-Hodgman algorithm?
- Answer: It is relatively simple, easy to understand, and can handle convex polygons.

17. How does the Sutherland-Hodgman algorithm handle coplanar polygons?
- Answer: Coplanar polygons may require additional considerations, as the Sutherland-Hodgman algorithm is designed for 2D.

18. What is the significance of the "output list" in the Sutherland-Hodgman algorithm?

- Answer: The output list contains the vertices of the clipped polygon, forming the final result.

19. Can the Sutherland-Hodgman algorithm be extended to handle self-intersecting polygons?
- Answer: The algorithm is not well-suited for self-intersecting polygons and may require modifications.

20. How does the Sutherland-Hodgman algorithm handle concave edges of a convex polygon?
- Answer: The algorithm processes convex edges one at a time, avoiding complications with concave edges.

21. What is the time complexity of the Sutherland-Hodgman algorithm?
- Answer: The time complexity is O(n), where n is the number of vertices in the input polygon.

22. Can the Sutherland-Hodgman algorithm be used for real-time graphics applications?
- Answer: It may not be suitable for real-time applications due to its time complexity and limitations.

23. How does the Sutherland-Hodgman algorithm handle polygons with holes?
- Answer: The algorithm may need additional processing to handle polygons with holes.

24. What is the role of the "inside" variable in the Sutherland-Hodgman algorithm?
- Answer: The "inside" variable helps track whether a vertex is inside or outside the clipping region.

25. In what scenarios might the Sutherland-Hodgman algorithm be preferred over other polygon clipping algorithms?
- Answer: The Sutherland-Hodgman algorithm may be preferred for simple implementations in scenarios where convex polygons need to be clipped against a rectangular window.