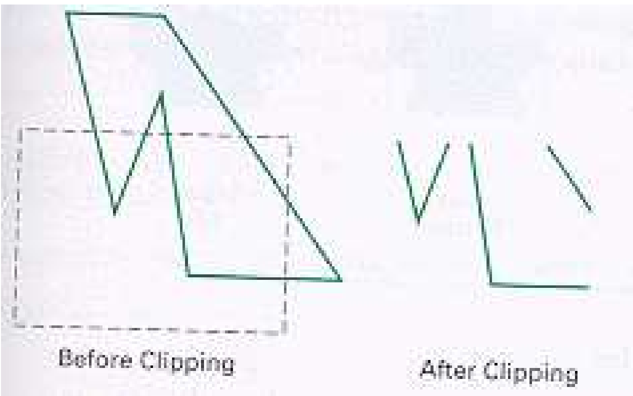
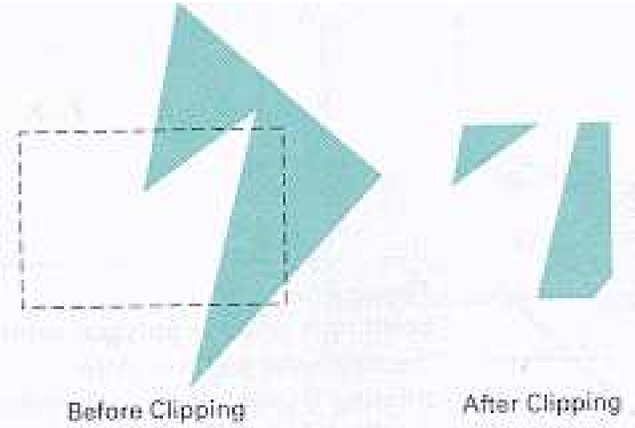
Clipping polygons

- If a polygon boundary is processed using a line clipping algrorithm, the result will be a series of unconnected line segments



- For polygon clipping, we want to generate one or more closed areas which can then be scan converted

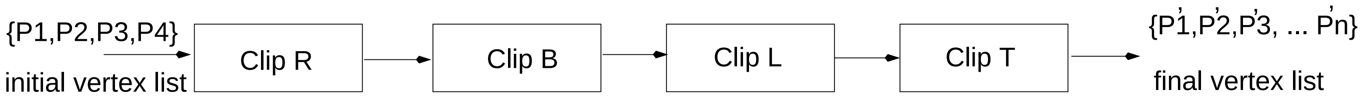


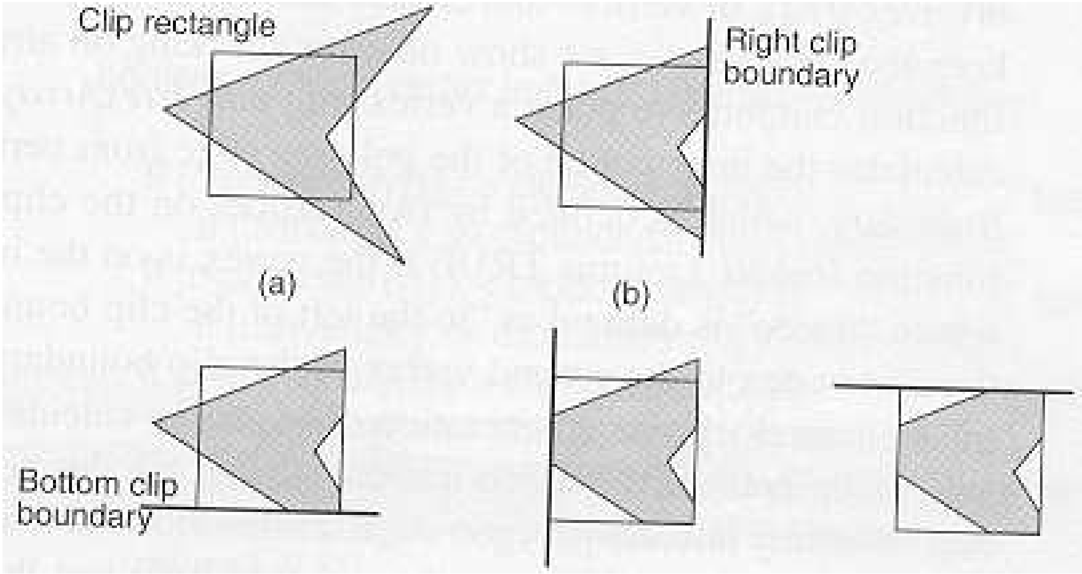
- New edges must be added, existing edges must be discarded, retained, or divided

- **Sutherland-Hodgman algorithm**

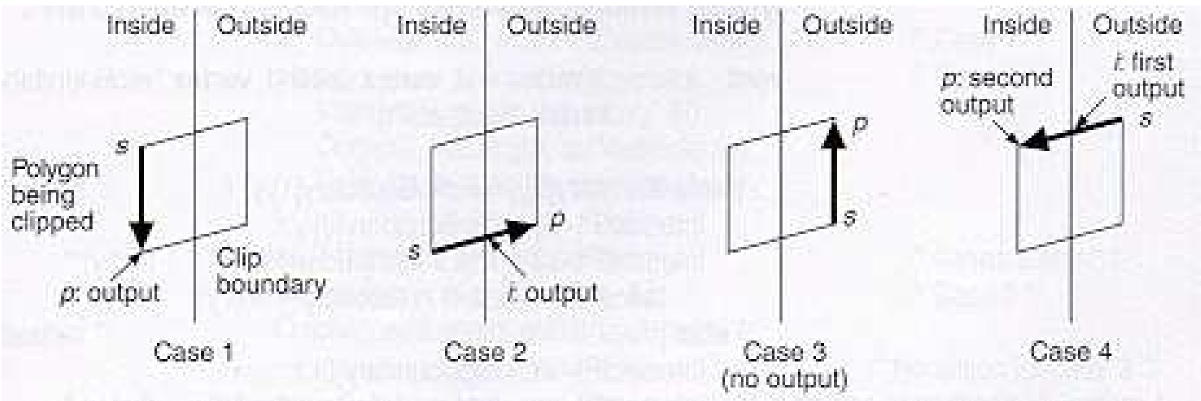
  - It can be used to clip any polygon (convex or concave) against any convex window

  - The algorithm clips against one clip edge at a time, producing a new vertex list each time





- Cases to be considered during clipping



- To calculate whether a point lies inside, outside, or on the clip edge, consider the dot product of the normal to the clip edge and the polygon edge

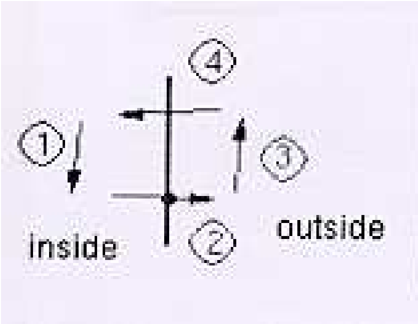
- Clip edges are enumerated in a counterclockwise direction to determine inside/outside halfplane

- **Steps of the algorithm**

  For each side of the clipping window

  For each edge of the polygon

  Output points based upon the following table



case #	first point	second point	output point(s)
1	inside	inside	second point
2	inside	outside	intersection point
3	outside	outside	none
4	outside	inside	intersection point and second point