Lecture-17
NDC :-

Date 07/03/18
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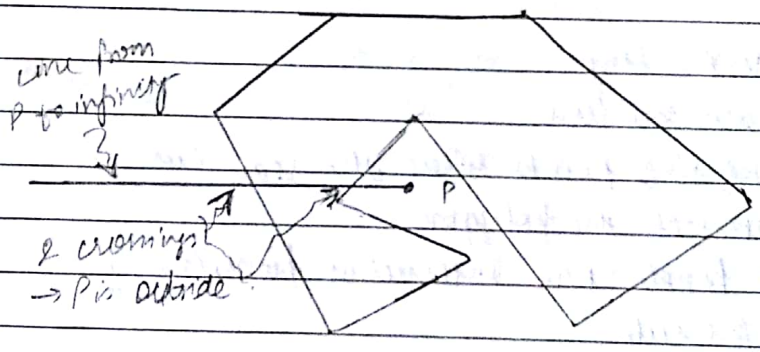
- To determine whether a point on the scan line lies inside or outside the polygon.
- Mostly used to identify a point in the hollow polygon.

Even-odd parity rule

Inside - outside test for a point P :

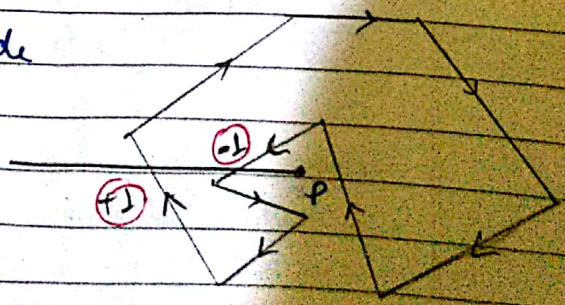
1. Draw line from P to infinity
   - Any direction
   - Does not go through any vertex
2. Count the # of times the line crosses an edge.
   - If # of crossings is odd, P is inside
   - " " " " even, P is outside



Non-zero winding number rule

Inside - outside test

1. Determine the winding number W of P
   a) Initialize W to zero and draw a line from P to infinity.
   b) If the line crosses an edge directed from bottom to top, W++.
   c) " " " " " " top to bottom, W--.
2. If the W = 0, P is outside
3. Otherwise, P is inside.

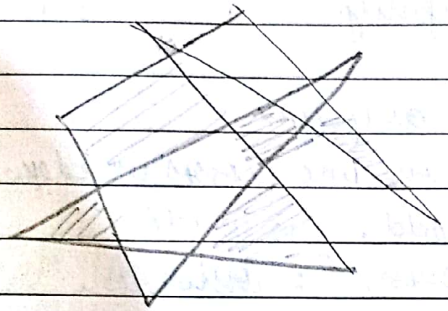


Here, W = +1 -1 = 0

∴ P is outside.

General polygons
- Can be self intersecting
- Can have interior holes.

- The non-zero winding number rules and the even odd parity rule can give different results for general polygons.



Raster based filling
- For each scan line
  - Determine points where the scan line intersects the polygon.
  - Set pixels b/w intersection points (using a fill rule)
    - Even odd parity rule: set pixels b/w pairs of intersections
    - Non-zero winding rule: set pixels according to the winding no.