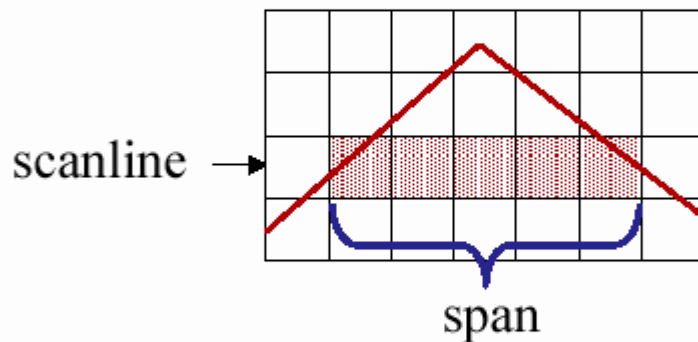


Definitions

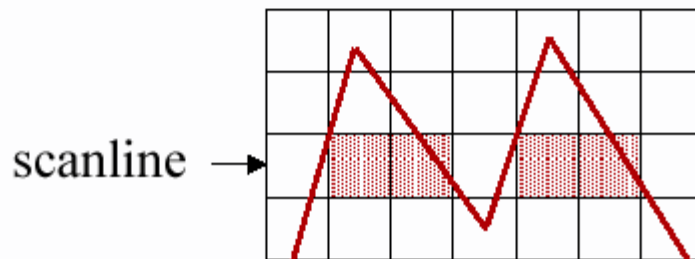
- Scanline: a row of adjacent pixels
- Span: pixels on a scanline within the primitive.



- Coherence:
 - Spatial Coherence: pixels that are adjacent on a scanline are similar
 - Edge Coherence: Edges that intersect scanline i should also intersect scanline $(i+1)$. We can incrementally calculate the new intersection point.

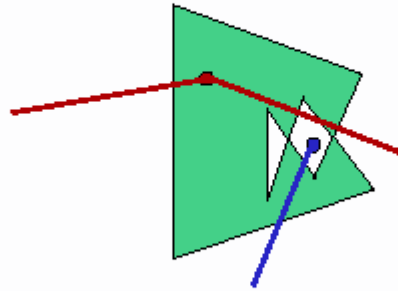
Basic Algorithm

1. Compute intersections of current scanline with all polygon edges and sort by x-value
2. Pair together adjacent intersections, each pair defines a span
3. Pixel is inside by even/odd criterion (e.g. use odd parity rule)



- **Odd Parity Rule:**

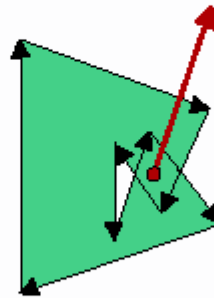
- Draw a line from point P to a distant point,
- If number of intersections between the polygon and the line are odd, then P is in. Otherwise P is out.



- We must be careful with lines that pass through vertices!

- **Nonzero Winding Number Rule:**

- Order the edges clockwise,
- Set $w = 0$ at P and shoot a ray from P to a distant point. Then walk along the ray and
 - Increment w for every edge that crosses the ray from left to right
 - Decrement w for every edge that crosses the ray from right to left



OR:

- Imagine the polygon as a rubberband on the wall,
- You stick a pin at point P . The winding number w at P is the number of loops the rubberband makes around the pin when you release it. All points with $w \neq 0$ are inside.