

Triangles

Drawing a triangle seems simple enough

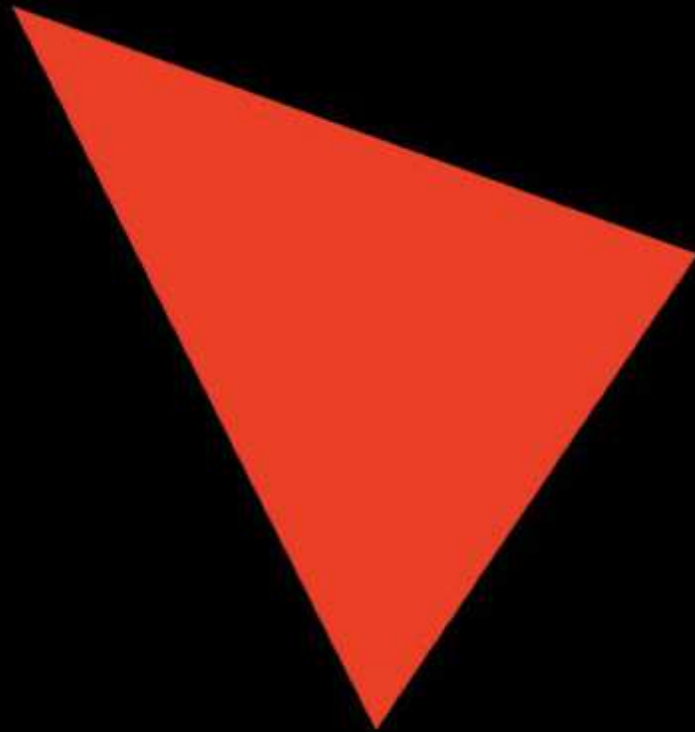
We just draw a line between each pair of vertices

How hard can it be ?

But what about a FILLED triangle ?

We have to "set" all pixels INSIDE the triangle

How should we go about this systematic filling ?



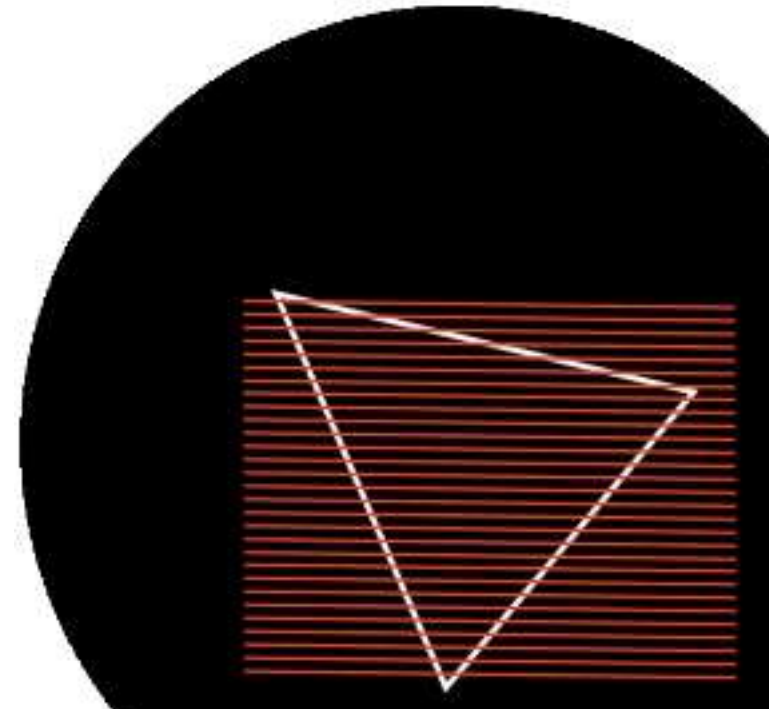
Filling Strategy

For simplicity's sake...

- lets fill the triangle line-by-line
- from top to bottom
- from left to right

This kind of drawing is called
"Rasterising"

Named after "rastrum"
(Latin for "rake")



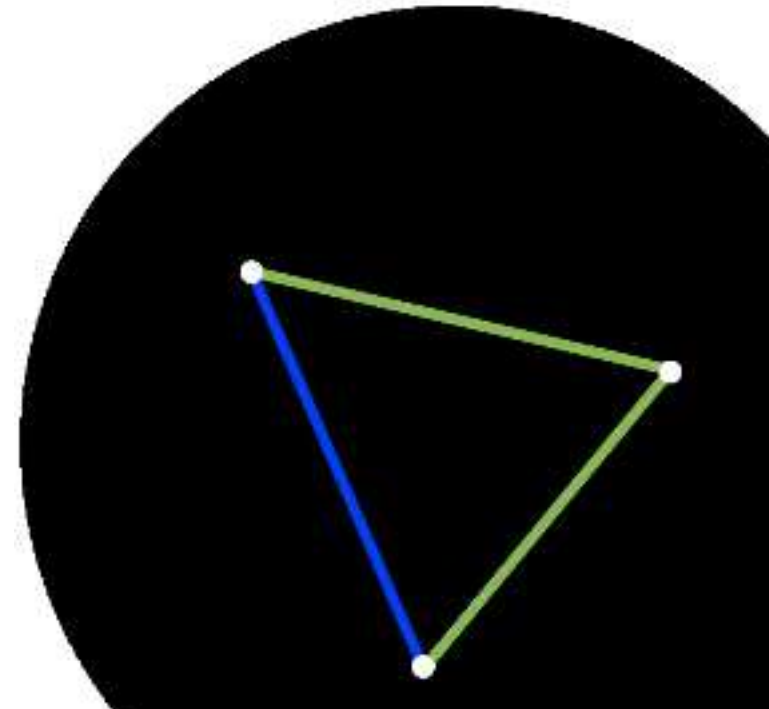
Problem

The problem is, the 3 vertices could be in any order:

- Which is the top and which is the bottom ?
- Which pair is the left side and which is the right ?

Also...

How do we elegantly deal with the problem that one side can "change direction" halfway down the triangle !
(the green side)

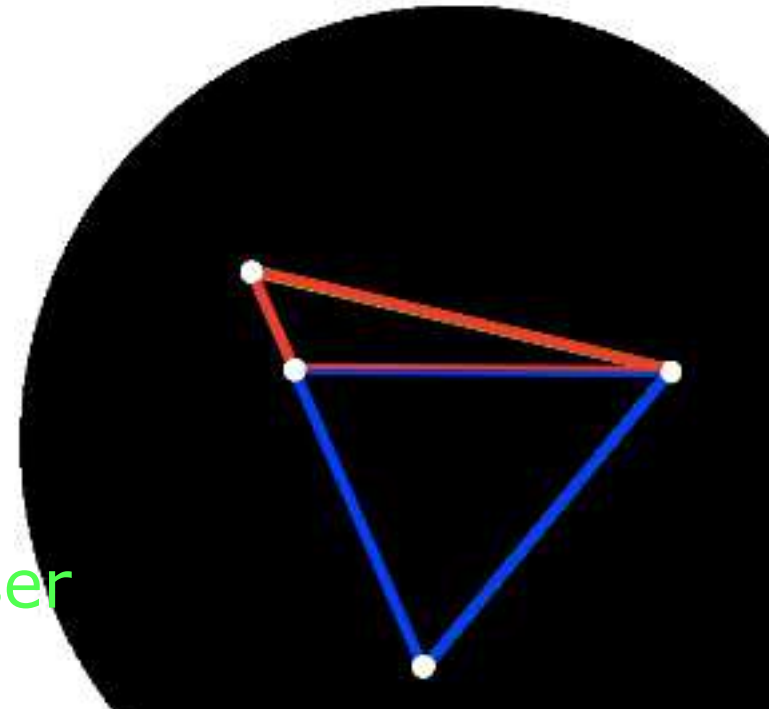


One Solution (my favourite)

- Sort vertices by vertical position (top to bottom)
- Divide triangle into 2 "flat-bottomed" triangles
(This solves the side-change problem !)
- Fill top triangle
(top-to-bottom, left-to-right)
- Fill bottom triangle
(top-to-bottom, left-to-right)

Let's see this in action:

TriangleRasteriser



New "Extra" point

How do we know where the "extra" point should be ?
(The newly created "left" point in the diagram)

Well, we know which row it should be on...
The same row as the "right" point

But what about its x coordinate ?
Well, we can interpolate that...
From "top" and "bottom" points

SimilarTriangles

