

The Problem

An artefact is composed of flat triangles,
each of which has a single surface normal

When shading the triangle to illustrate lighting
it is bound to look like a flat surface (because it is !)

This can make the artefact look low-res and blocky
Particularly if there aren't that many triangles !

For example...

Flat Surface Shading



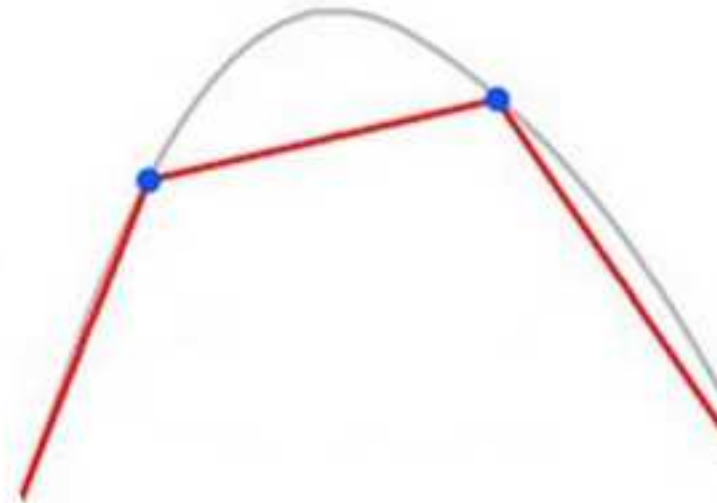
Flat

Intelligent Shading ?

What if we could shade triangles more "intelligently" ?

Not just looking at each triangle in isolation
But also at the surrounding triangles

Detect the "trend" of the surface
Smooth those sharp corners
Blend triangles together
Avoid ugly flat faces



Gouraud Shading

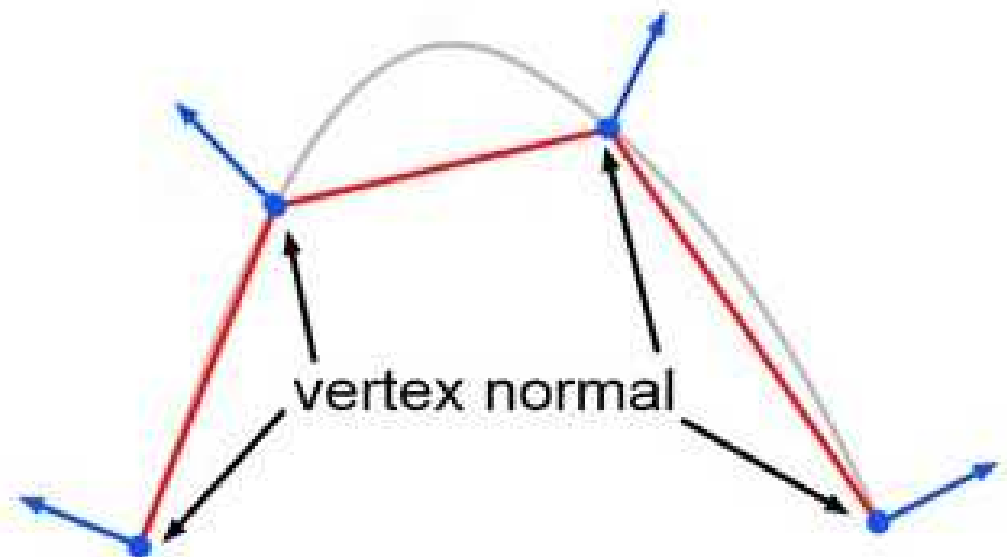
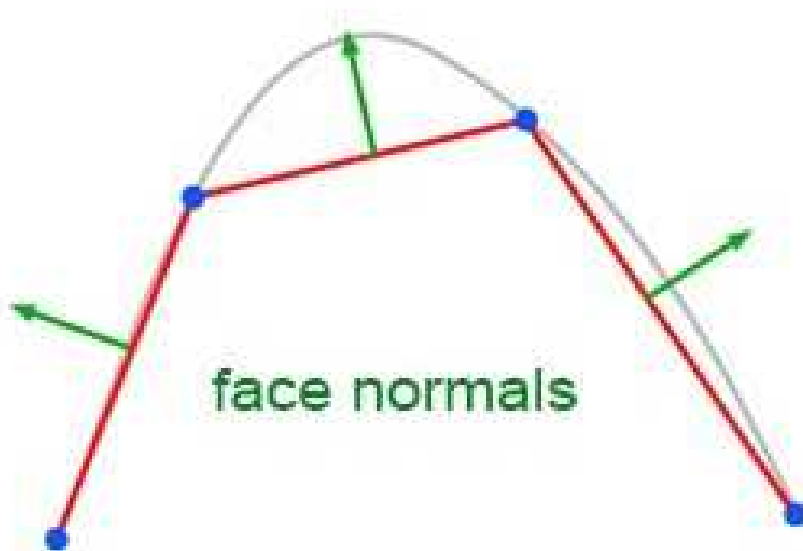
Gouraud shading is one such intelligent approach

Rather than shading whole triangle with a flat colour
(Based on the triangle's single surface normal)

We shade each pixel on the triangle uniquely
(Based on "Vertex Normals"...)

Vertex Normals

A Vertex Normal is calculated by taking the average of all Face Normals that "involve" that vertex



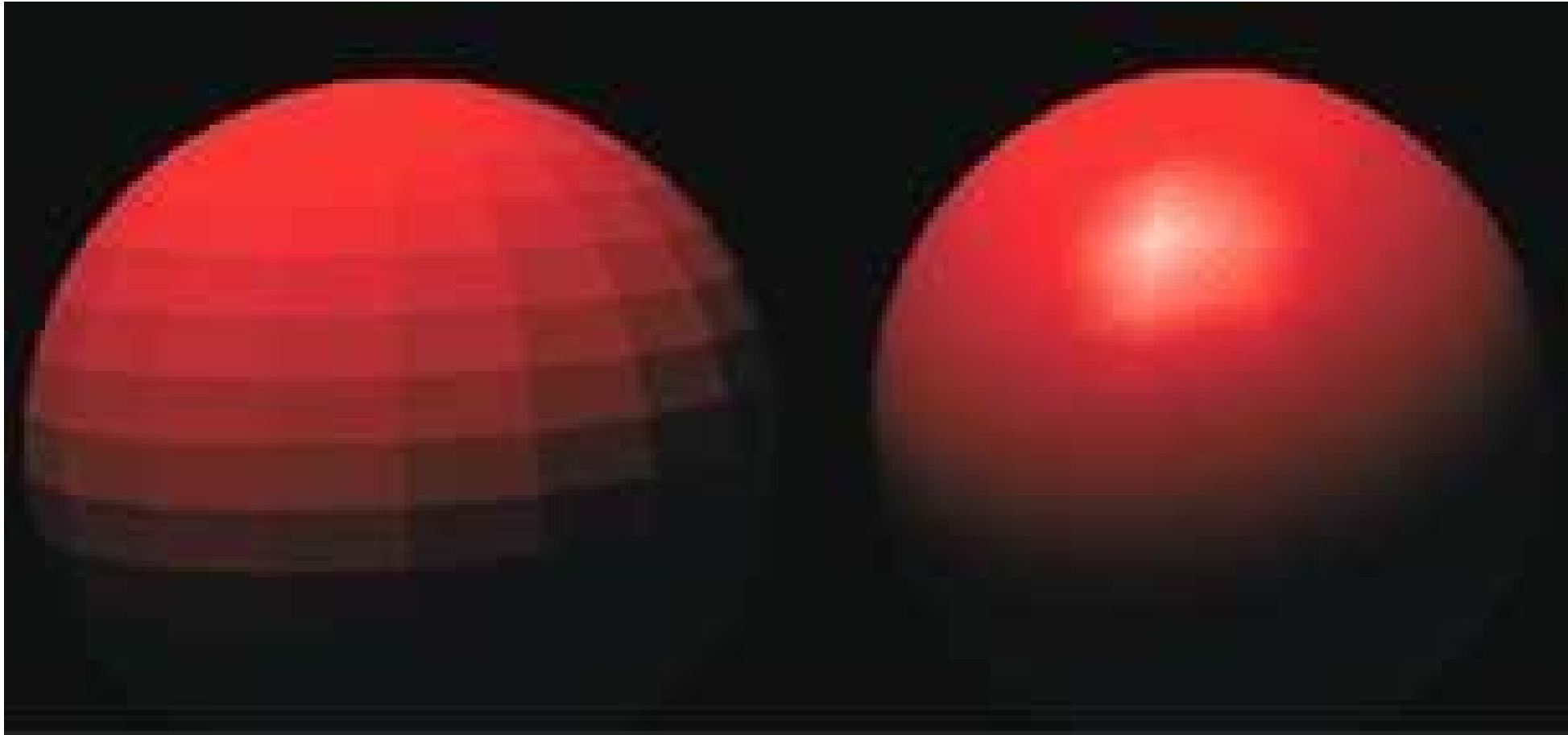
Lighting Calculation

Each triangle now has THREE normals !
Each of which can be used to calculate lighting
(proximity, angle-of-incidence, specular etc.)

We can interpolate these values
across the face of the triangle

A bit like we did with colours
in the 2D palette practical...

Same Geometry - Different Shading



Flat

Gouraud