Topics

- Week 1
  - intro; distinctions between rendering, animation, modelling; how a pinhole camera works
- Week 2
  - General ideas of OpenGL and rendering pipeline; points, lines and triangles; double buffering; strips and fans; flat and interpolated shading; normals on meshes;
  - transformations; rotations in 2D and 3D; constructions to do with rotations; homogenous coordinates

Topics

- Week 3
  - Viewing process; orthographic cameras; perspective cameras; view frustrum; perspective projection as a transformation in homogenous coordinates; view volumes; methods of specifying cameras
  - Shading; general ideas; point light sources, distant and nearby; surfaces, BRDF, albedo, specular and diffuse effects; shading for a diffuse surface with a point light source; linear interpolation of shading (or Gouraud shading); specular reflection (of sources); Phong's model; what happens to Phong's model with Gouraud shading; ambient illumination; flat shading; Phong shading

Topics

- Week 4
  - Culling bounding boxes; Clipping; lines against rectangles by cutting off ends; lines against rectangles by case-by-case reasoning; lines against rectangles by parametric clipping; polygons against halfspaces by thinking about vertices; wierd phenomena that occur
  - Filling polygons; convention about what's inside; spans; edge table; left, right edges; how to remove/add edges; rasterizing lines using Bresenham's algorithm;

Topics

- Week 5
  - shaders; linear interpolation over polygon can be applied to many things; intensity can be given a functional form; many effects result
  - Visibility; the z-buffer; the a-buffer; the painters algorithm; the BSP tree; cells and portals style algorithms

Topics

- Week 6
  - Lagrange interpolates (construction, properties); Hermite curves (construction of blending functions, properties); Bezier curves as repeated linear interpolates; blending functions for Bezier curves (Bernstein polynomials); constructing a point on a Bezier curve; subdividing Bezier curves; transforming a Bezier curve into an Hermite curve; properties and sketching for Bezier and Hermite curves; geometry and basis matrices; general notions of parametric and geometric continuity; Catmull Rom construction for joining up Hermite curves; simplest surfaces (extruded; cones; ruled)

Topics

- Week 7
  - Hierarchical modelling; instancing; stacks; parametrization
  - Animation; basic ideas; keyframing and interpolation; stop-motion; morphing; plane deformations using a Bezier construction; motion capture; forward and inverse kinematics; particle systems; simple physical animation (ballistic + collision); L-system procedural animation;