- What is the difference between Phong shading and Phong lighting (the Phong reflection model)?

While using Phong lighting we use surface material and light to construct light reflection on our rendered surface. For Phong shading we need additionally interpolate normals across each polygon, before we can implement Phong shading through a fragment shader to add shading to our rendered picture.

- What is the difference between flat shading, Gouraud shading, and Phong shading? List pros and cons of each. Is Gouraud or Phong shading the best method for simulating highlights? Explain.

Flat shading: Uses three vectors, if constant the shading calculation needs to be carried out only once for each polygon, and each point on the polygon is assigned the same shade.

Pro: Easiest method to construct

Con: If our polygonal mesh has been designed to model a smooth surface flat shading will almost always be disappointing because we can see even small differences in shading between adjacent polygons, very unrealistic

Gouraud shading: Material properties are used in combination with the three vectors, so each vertex will have its own color that the rasterizer can use to interpolate a shade for each fragment. Normal is define at a vertex to be the normalized average of the normals of the polygons that share the vertex.

Pro: Deceptively simple

Con: Hard to find the normals, that should be averaged together

Phong shading: Instead of interpolating vertex intensities, as we do in Gouraud shading, we interpolate normals across each polygon.

Pro: Most realistic, takes a lot of variables into account(specular light, diffuse, ambient, specular lighting)

Con: Hardest method to construct

- What is the difference between a directional light and a point light?

An ideal point source emits light equally in all directions. For directional light we calculate the intensity at each point as we move across a surface, which just like the light from the sun strikes all objects.

- Does the eye position influence the shading of an object in any way?

Yes, it mostly influences specular light.

- What is the effect of setting the specular term to $(0, 0, 0)$?

There won't be any specular light, which also means no shininess.

- What is the effect of increasing the shininess exponent (α)?

The shininess will be more intensely gathered into centre.

- In what coordinate space did you compute the lighting?

Eye space.