Pattern Recognition, Image Processing and Computer Graphics
Test Exam

Rendering Pipeline	true	false
The depth test is performed in the fragment processing stage.	◯	◯
Stencil tests are performed in the vertex processing stage.	◯	◯
In Phong shading, the illumination model is evaluated per vertex. In Gouraud shading, however, the illumination model is evaluated per fragment.	◯	◯
Blending combines the color of an incoming fragment with the framebuffer color at the pixel position of the incoming fragment. The resulting color replaces the respective framebuffer color.	◯	◯

Homogeneous Coordinates and Transforms	true	false
The same modelview transform is applied to all objects in a scene.	◯	◯
Affine transformations map the midpoint of a line segment to the midpoint of the transformed line segment.	◯	◯
$(9,6,3,1)^T$, $(-9,-6,-3,-1)^T$, $(9\cdot\sqrt{2}, 6\cdot\sqrt{2}, 3\cdot\sqrt{2}, 1\cdot\frac{2}{\sqrt{2}})^T$ are all homogeneous coordinates of the same point in Cartesian space.	◯	◯
$(3,4,0)^T$ is a point at infinity on the line $4x - 3y + 1 = 0$.	◯	◯

Projections	true	false
Perspective projection is an affine transform.	◯	◯
In OpenGL, the orthographic projection is a combination of translation and scaling.	◯	◯
In OpenGL, projective transforms map from object space to clip space.	◯	◯
In OpenGL, perspective projections non-linearly map the z-component from camera / eye space to normalized device coordinates.	◯	◯

Lighting	true	false
The inverse square law states, that the number of photons emitted in direction ω and hitting a planar surface area dA orthogonal to ω at distance r is inversely proportional to r^2.	○	○
Radiance is radiant flux per unit solid angle per unit projected area incident on, emerging from, passing through a point of a surface in a certain direction.	○	○
If wavelengths in the visible spectrum are equally distributed, humans perceive such mixtures as chromatic colors.	○	○
In the Phong illumination model, the computation of the specular component is independent from the light source direction.	○	○
In Phong shading, the lighting model is evaluated per vertex, not per fragment.	○	○

Shadow Algorithms	true	false
In projection shadows, the geometry of occluders has to be processed twice in the rendering pipeline.	○	○
In shadow mapping, the shadow map stores distances to shadowed surface points.	○	○
In the z-pass algorithm for shadow volumes, the stencil value at a pixel position is incremented if a fragment of a front face of the shadow volume at this pixel position is closer to the viewer than the closest fragment of the scene at this pixel position.	○	○
The z-fail algorithm does not work, if shadow volume polygons are clipped at the near plane.	○	○