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TECHNISCHE UNIVERSITÄT DARMSTADT

„Game Technology“
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Exercise 5

For bonus points upload your solutions until **Saturday, December 17, 9:50**

General Information

- The exercises may be solved by teams of up to three people.
- The solutions have to be uploaded to the Git repositories assigned to the individual teams.
- **The submission date (for practical and theoretical tasks) is noted on top of each exercise sheet.**
- If you have questions about the exercises write a mail to game-technology@kom.tu-darmstadt.de or use the forum at https://www.fachschaft.informatik.tu-darmstadt.de/forum/viewforum.php?f=557

T5 Practical Task: Blinn-Phong lighting (5 Points)

Implement the Blinn-Phong shading model in GLSL. Also, port your camera code to GLSL. Define the camera parameters using uniform declarations and set their values using Kore's Graphics API.

Feed the information about the camera to your shader by adding code to Exercise.cpp. Implement shader.vert and shader.frag accordingly (carry out transformations in the vertex shader, carry out shading in the fragment shader).

https://github.com/TUDGameTechnology/Exercise5.git contains additional code to help you out. You can either copy the code changes manually or just pull them into your own repository using
git pull https://github.com/TUDGameTechnology/Exercise5.git

Please remember to push into a branch called "exercise5".

T5 Theoretical Tasks: Where there is light, there must be shadow (5 Points)

T5.1 Blending Order (2 Points)

According to our lecture, rendering semitransparent objects correctly requires correct rendering order (from back to front). Have a closer look at the equations for standard and additive blending and verify or debunk our statement for both equations individually.

T5.2 Antialiasing (2 Points)

What is the major shortcoming of post-process anti-aliasing? Why is it used nonetheless?

T5.3 Roughness (1 Point)

In the literature, diffuse reflection can denote two things. In the lecture, we introduced diffuse reflections as light that penetrates the molecular structure of an object and then leaves in a completely random direction. Elsewhere diffuse reflection is defined as direct reflections from rough surfaces. In reality these semi-diffuse reflections look like blurred, direct reflections. In the lecture, we showed two special kinds of texture maps, mip maps and cube maps. How can those be used to implement blurred reflections aka roughness?