

### CG Programming II – Assignment #3

In this assignment you will implement the Cook-Torrance BRDF. The each surface should have ambient, diffuse, and specular reflection present. All lighting must be calculated *per-fragment* by a GLSL fragment shader.

Required graphical elements:

- Rotating object with *more than* 8 surfaces. Any object will suffice, but it must be more complex than an octahedron.
  - The `glsl_helloworld.cpp` has code to generate a sphere. This could be useful...
- Animated point light source.
  - Light source moves (e.g., orbits the object).
  - Light source has constant color.
  - Light source is represented on the screen using a point. Setting the point size  $> 1.0$  would be helpful, but is not required.
- Specular, diffuse, and ambient reflection performed in a GLSL fragment shader using the Cook-Torrance BRDF.

Required inputs:

- Escape must terminate the program.
- A key sequence must be available to increment and decrement the index of refraction of the rendered surfaces (e.g., pressing '[' and ']').
- A key sequence must be available to increment and decrement the smoothness ( $m$  in the D factor) of the rendered surfaces (e.g., pressing 'q' and 'a').
- A key sequence must be available to pause the animation of the object.
- A key sequence must be available to pause the animation of the light source.

<i>Criteria</i>	<i>Excellent</i>	<i>Good</i>	<i>Satisfactory</i>	<i>Marginal</i>	<i>Unacceptable</i>
Code Function	Program correctly implements all required graphical elements in a manner that is readily apparent when the program is executed. Appropriate algorithms and data structures are used in the implementation.	Program implements all required graphical elements, but the operation of some elements may not be obvious. Appropriate algorithms and data structures are used in the implementation.	Program implements all required graphical elements in some fashion. Algorithms and data structures are used that perform the required function, but may be less than ideal.	Program implements most required graphical elements in some fashion.	Most or all of the required graphical elements are missing or do not function correctly.
Code Mechanics	Program code is formatted in a consistent manner, variables and data structures are named in a consistent, logical	Program code is mostly consistent, but contains some occasion inconsistencies.	Program code is readable. Individual functions or code blocks show consistent formatting, but that	Program code is not consistently formatted, but is still somewhat readable.	Program code is a mess and may be more suitable as an entry to the International Obfuscated C

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	manner. Code is commented adequately.		formatting does not carry through the entire program.		Coding Competition.
<b>User Interface</b>	The program is responsive to input. All required inputs are implemented, and the user is informed, by the program, what the inputs are. The program can be terminated by the user.	The program is responsive to input. All required inputs are implemented. Some of the inputs are documented by the program.	The program is unresponsive under some circumstances. All required inputs are implemented. Some of the inputs are documented by the program.	The program is unresponsive under some circumstances. Some of the required inputs are either not implemented or are not implemented correctly. Some of the inputs are documented by the program.	Many of the required inputs are either not implemented or are not implemented correctly. The program lacks documentation for the inputs.