LUNDS TEKNISKA HÖGSKOLA   Institutionen för datavetenskap

Exam
EDA221 Computer Graphics : Introduction to 3D

2013–01–10, 14.00–19.00, Sparta:A

Answers may be given in Swedish or English.
Dictionaries for English (and the native language for each student) are allowed.
Electronic calculators are **not** allowed.

Grading: The maximum score is 6.0. A score of 3.0 or above is needed to pass.

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1. Spaces

   What is a *space* in the context of computer graphics? Provide three examples of spaces that you have encountered and explain what they are used for. *(1.0p)*

2. Vector algebra

   a) What is the difference between a *point* and a *vector*? How are they represented in homogenous form? *(0.2p)*

   b) Provide formulas for the following vector operations: *2-norm* (length), *dot product*, *cross product* and *reflection*. Give examples of application in computer graphics for each operation. *(0.8p)*

3. Shading

   a) What is the equation for *Phong shading*? Explain each term. *(0.5p)*

   b) Give an example of a *Phong material*, including values for the Phong coefficients. Motivate the coefficient values. *(0.2p)*

   c) In what sense is Phong shading an approximation of the rendering equation? *(0.3p)*

4. Scene content

   a) What is a *scene graph*? What's the advantages of using a scene graph?. *(0.3p)*

   b) Provide a scene graph, including relations and transformations, with objects undergoing *spin* as well as *orbit*. *(0.3p)*

   c) Explain *tessellation*. *(0.4p)*

5. Interpolation

   Describe the following types of interpolation: *linear*, *bilinear*, *barycentric* and *cubic*. What can each respective type be used for in computer graphics? *(1.0p)*

6. Viewing

   a) What is *orthographic projection*. Define such a matrix. *(0.4p)*

   b) What is *perspective projection*. Define such a matrix. *(0.6p)*

The end.