Exam 1TD388, 2021-03-19

⚠ Det här är en förhandsvisning av den publicerade versionen av quizet

Startad: 13 dec kl 15.38

Instruktioner för Quiz

In the first question of this quiz, you will be asked to upload an image of some ID (photo of your ID card, driver's license, or passport). This is to verify that you were the person who wrote and handed in the exam. Then, you are supposed to pick the correct statements for each of the questions. An example:

If a question has maximum N points and there are x choices that are correct, then each correct answer awards you N/x points, while every wrong answers will reduce by N/x. But you cannot get less than zero per question! In other words, if a question has 6 points and 4 answers are correct then every correct answer you choose will give you 1.5p. If you do not choose a correct answer you will not get the 1.5p for that choice. But if you choose a wrong answer the total credit will be reduced by 1.5p, but you cannot get less than zero.

Please take as much time as you need to answer the questions as well as possible. However, hand-in time will play a factor if you are less than 1 point from a higher grade: if you completed the exam in less than 2.5 hours (half the time), your score will be rounded up, otherwise, it will be rounded down. The motivation for this is that if you took longer time, you probably had to go back more often and look up things in the book and the course material. But do not feel any stress, and submit the exam when you are satisfied with your answers! Also, let us know if you generally need longer examination time because of dyslexia or similar.

Note that the questions cover the general case: there might be some special case we as teachers have not thought about (but clever students would think of). What should you do then? Remember re not clever students, so answer for the general case!

Grade limits:
5: 35p 4: 28p 3: 20p

You can always email fredrik.nysjo@it.uu.se during the exam if something is unclear!

Good luck!

Fråga 1	**0 poäng**
Please upload your ID (e.g. student ID, drivers licence or passport)	

Ladda upp Välj en fil

Fråga 2 3 poäng

$$\frac{1}{a+bd+cd^2}(K_a L_a + K_d L_d \max(\mathbf{N}\cdot\mathbf{L}, 0) + K_s L_s (\mathbf{R}\cdot\mathbf{V})^{\alpha})$$

- [ ] The above equation uses the halfway vector introduced by J. Blinn.
- [ ] The three constants Ka, Kd, Ks in the equation above usually represents the color of the Material with respect to ambient, diffuse and specular light, respectively.
- [ ] The equation above does not include the distance falloff.
- [ ] The max function is used in the equation so that the light intensity does not become negative, as there is no such thing as negative light.
- [ ] In the equation above, the diffuse component is computed using the Lambert law of cosines, which defines how much light is spread out over a surface, depending on the angle of the light source direction and the normal.
- [ ] The exponent (alpha) in the Phong Illumination equation above regulates the size of the specular highlight.

▸

Fråga 3 3 poäng

What features describes Phong shading correctly?

- [ ] It is generally much faster than Gauruad
- [ ] It has worse Mach band problems than Gouraud
- [ ] It computes the Phong illumination equation per pixel
- [ ] It creates better shading than Gouraud
- [ ] It produces better highlights than Gouraud

- [ ] It interpolates colours over the polygon

Fråga 4 — 3 poäng

What is true about raytracing?

- [ ] It is generally more computational expensive than Phong shading
- [ ] It is often used for matte surfaces
- [ ] It is often used for specular surfaces
- [ ] The phong illumination equation is often replaced by a BRDF or similar
- [ ] It can be used for translucent objects
- [ ] It uses the form factor

Fråga 5 — 2 poäng

What is true about the Sutherland-Hodgeman clipper?

- [ ] All stages in the pipeline can be done on parallel
- [ ] It is a pipeline clipper
- [ ] It does backface culling
- [ ] It is based on scissoring
- [ ] It cannot clip triangles, just lines

Fråga 6 — 2 poäng

If you would make an object that looks like an orange that is slightly dirty, what rendering techniques would use to **make it look like** a real orange?

- [ ] Back face culling
- [ ] Environment mapping
- [ ] Texture mapping
- [ ] Scissoring
- [ ] Bump mapping

Fråga 7 — 2 poäng

If you would make an object that looks like smooth clean shiny silver ball, **what techniques wold you typically use so it looks good**?

- [ ] Scissoring
- [ ] Texture mapping
- [ ] Environment mapping
- [ ] Bump mapping
- [ ] Back face culling

Fråga 8 — 2 poäng

In a typical graphics pipeline, what comes after projection?

- [ ] Z-buffering
- [ ] View normalisation
- [ ] Rasterisation
- [ ] 3D clipping
- [ ] Shading

Fråga 9

2 poäng

What are the purposes of mipmapping?

- [ ] To make faster clipping
- [ ] To be able to use Gouraud instead of Phong Shading
- [ ] To increase rendering speed
- [ ] To perform back face culling efficiently
- [ ] To perform antialiasing

Fråga 10

2 poäng

What is correct about fix point rotations?

- [ ] It is a mix of scaling and rotation operations
- [ ] It makes it possible to rotate an object, despite its position in space
- [ ] Only ONE matrix is used to do all transformations needed to perform the rotation
- [ ] They are frequently used to be able to animate complex objects
- [ ] They are much faster than rotation around the origin

Fråga 11

2 poäng

What is true about rotation matrices?

- [ ] They contain arc functions
- [ ] They contain the sine and cosine
- [ ] The norm of all columns are 1
- [ ] The matrix looks exactly the same for rotation around any axis. It is just the functions that change sign

- [ ] Homogenous coordinates are not necessary

Fråga 12

2 poäng

What is true about translation matrices?

- [ ] The diagonal is set to 1
- [ ] They cannot be combined with scaling matrices trough matrix multiplication
- [ ] The norm of each row is 0
- [ ] They typically have a column or a row where the translation for each axis is found
- [ ] Homogenous coordinates are not necessary

Fråga 13

2 poäng

What is true about perspective projection?

- [ ] It is exactly the same as Orthogonal projection
- [ ] In early medieval paintings the perspective is often wrong
- [ ] perspective division will make sure that objects further away looks smaller
- [ ] All vertexes are projection onto the front clipping plane
- [ ] It is computed by first defining a centre of projection

Fråga 14

3 poäng

What is true about splines?

- [ ] They can theoretically be of any positive degree, but 3 is preferred in Computer Graphics

- [ ] Bernstein polynomials always have degree 3
- [ ] All cubic splines has C3 continuity
- [ ] The Utah teapot was created using Bezier Patches
- [ ] B-splines can be used to create smooth camera movements in a scene
- [ ] B-splines generally do not intersect the control points

Fråga 15

3 poäng

What is true about Global Illumination algorithms?

- [ ] The so called form factor, is essential for the Half way vector computation.
- [ ] Octrees can be used to divide 3D space so that ray/triangle intersections are computed faster.
- [ ] Radiosity is usually used for highly specular surfaces and translucent surfaces.
- [ ] Bounding spheres are faster to compute than bounding boxes
- [ ] Bounding objects are typically used to improve the speed in which ray/triangle intersections are computed.
- [ ] Raytracing is first of all aimed for matte surfaces (computing diffuse light only).

▸

Fråga 16

2 poäng

What is true about hidden surface removal and clipping?

- [ ] A typical pipeline clipper divides the space into 9 regions and compute out codes for fast clipping.
- [ ] Clipping can typically be done either before or after projection. I.e. clipping can be performed in 3D or in 2D.
- [ ] Backface culling is a method to improve interpolation over triangles in Gouraud shading.
- [ ] Clipping can be done for both orthogonal and perspective projections

Fråga 17

3 poäng

What is true about render-to-texture and post-processing effects?

- [ ] The resolution of color and depth attachments in a framebuffer object must be the same as the screen resolution or the window size
- [ ] Ray tracing is often used in shadow mapping to render the depth image of the shadow map
- [ ] Even when using framebuffer objects, post-processing effects can still be expensive because they might require many samples from a texture
- [ ] Increasing the resolution of a shadow map can completely eliminate aliasing around edges of shadows
- [ ] The use of framebuffer objects allows us to render more complex geometry (more triangles)

Fråga 18

2 poäng

What is true about volume rendering?

- [ ] Maximum intensity projection (MIP) is typically used to render a surface representation of the volume data
- [ ] Volume rendering was used for the cube mapping part of the third assignment in the course
- [ ] A GPU with 4 GB video memory can easily store a volume with 1024^3 voxels (assuming each voxel takes up 1 byte))
- [ ] The quality of volume rendering is dependant on the resolution of the voxel data

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Lämna in quiz