EXAM
DH2320 Computer Graphics and Visualization
2012-12-15

Teacher: Marcus Nilsson, marcuni@kth.se

Aids: None

The exam consists of 10 questions. The number of points awarded for a correct answer is stated next to each question. The maximum score is 22. To pass the exam, you need at least 13 points.

Write legibly! Answers that I cannot read will receive 0 points! When explaining, try to be as concise and clear as possible! Answers that I cannot understand will receive 0 points! Feel free to use figures/sketches to complement your written explanations.

Good luck! /Marcus

Question 1 (2p): Describe preferably with a sketch what this WebGL code will produce. Only the important part of the code is included.

```
…
vertices = [ 0,0,0, 0,1,0, -1,0,0,
             0,0,0, 1,0,1, 0,-1,0];
…
colors = [ [ 0.0, 0.0, 0.0, 1.0 ],
           [ 1.0, 1.0, 1.0, 1.0 ]];
…
mat4.translate(mvMatrix, [ 0.0, 0.0, -5.0 ]);
mat4.rotate(mvMatrix, 45*Math.PI / 180, [ 0, 0, 1 ]);
…
gl.drawArrays(gl.TRIANGLES, 0, 6);
…
```

Question 2 (2p): In OpenGL/WebGL, what are object coordinates? What are eye coordinates? What is the relationship between them?

Question 3 (2p): What is a depth buffer? How does it differ from a color buffer? Explain how a depth buffer can be used in real-time graphics!

Question 4 (2p): Describe the difference between an interpolating spline and a Bezier spline!

Question 5 (3p): The Phongs reflection model is a sum of three terms that each models a specific type of light reflection. Name and describe the three terms!

Question 6 (2p): In animation, describe the principle of anticipation!

Question 7 (2p): Describe the difference between key frame animation and inverse kinematics!

Question 8 (1p): Describe the visualization encoding that is best for most data and a situation when it is impossible to use it.

Question 9 (4p): The course notes describe a user-centered visualization design process with five steps. Describe this process!

Question 10 (2p): Why is the rainbow color map often a poor choice for encoding data in visualization?