Malaviya National Institute of Technology Jaipur
Department of Computer Science Engineering
Computer Graphics CST310
Mid-sem Quiz, Date: April 23, 2024

Time: 10:00 am-11:00 am (1 hour)   Spring 2024, VI Semester

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1. Concerning phong shading and Gouraud shading in a scene, which of the following statements is true?

   (I). Gouraud shading requires more computation than Phong shading.
   (II). Gouraud shading linearly interpolates the color of an interior pixel from the color at the vertices.
   (III). Phong shading interpolates over the normal vectors specified at the vertices.
   Choose the correct answer from the options given below:
   (a). (I) and (II) only
   (b). (I) and (III) only
   (c). (II) and (III) only
   (d). (I), (II), and (III)

2. Which of the following statements is/are True regarding the solution of the visibility problem in 3D graphics?
   S1: The painter's algorithm sorts polygons by depth and then paints (scan-converts) each Polygon onto the screen starting with the nearest polygon.
   S2: Backface Culling refers to eliminating geometry with backfacing normals.
   (a). S1 only
   (b). S2 only
   (c). Both S1 and S2
   (d). Neither S1 nor S2

3. Which of the following statements is/are correct with reference to curve generation?
   (I). Hermite curves are generated using the concepts of interpolation.
   (II). Bezier curves are generated using the concepts of approximation.
   (III). The Bezier curve lies entirely within the convex hull of its control points.
   (IV). The degree of the Bezier curve does not depend on the number of control points.
   (a). I, II, and IV only
   (b). II and III only
   (c). I and II only
   (d). I, II, and III only

4. Fill in the blanks of the following pseudo-code of ray-triangle intersection:

RayTriIntersect(o,d,v_0,v_1,v_2)
returns(REJECT, INTERSECT, u,v,t);
1. $e_1 = v_1 - v_0$
2. $e_2 = v_2 - v_0$
3. p = (a)._____
4. a = e_1.p
5. if($a > -\epsilon$ & $a < \epsilon$) return (b)._____;
6. f = 1/a
7. s = o - v_0
8. u = f(s.p)
9. if (c)._____ return (REJECT, 0, 0, 0);
10. q = $s \times e_1$
11. v = f(d.q)
12. if($v \leq 0.0$ or $u + v \geq 1.0$) return (REJECT, 0, 0, 0);
13. t = (d)._____
14. return (INTERSECT, u, v, t);

where u and v are the barycentric coordinates. o is the origin, and d is the direction. v_0,v_1,v_2 are the vertices of the triangle.

Best wishes