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TCS–702

B. TECH. (CSE)
(SEVENTH SEMESTER)
END SEMESTER EXAMINATION, 2018

COMPUTER GRAPHICS (E-DDN)

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains *five* questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are **twenty**.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What are some of the applications of Computer Graphics ? Explain the working of a flat panel displays with a neat diagram.

(b) Distinguish among the following terminologies and explain each of them in detail :

(i) Raster Scan display and Random Scan display

(ii) OpenGl and Webgl

(iii) Virtual Reality and Augmented Reality

(c) Discuss basic syntax of OPEN GL program. List various libraries and header files used in OPEN GL.

2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is a homogeneous coordinate system ? Using homogeneous coordinate system how we can represent two-dimensional Translation, Rotation and Scaling matrices ?

(b) Show that transformation matrix, for a reflection about the line $y = x$, is equivalent to a reflection relative to the x-axis followed by a counter clockwise rotation of 90°.

(c) Derive a rotation matrix for two dimension rotation of a point about origin. What are the new vertices of a triangle with original vertices (20, 0), (60, 0), (40, 100) rotated 90° clockwise about the origin ?

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain with diagram the two-dimensional viewing transformation pipeline. Mention different spaces which are included in the pipeline.

(b) Elaborate Cohen-Sutherland Line Clipping algorithm. Show its working on a line p (7, 9) to q (11, 4) when the clipping rectangle is defined by diagonal points A (4, 4), B (10, 8).

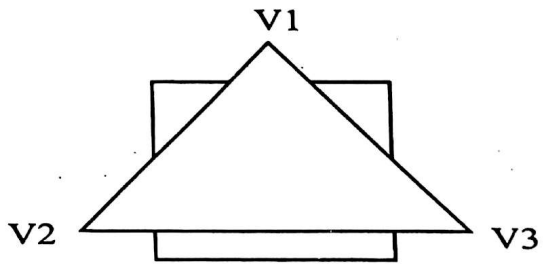
(c) Write short notes on the following :

(i) Curve Clipping

(ii) Text Clipping

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Use Sutherland-Hodgman algorithm to clip the given polygon.



(b) What is a Bezier curve ? Explain with example the steps involved in designing a cubic Bezier curve with given control points.

(c) Write short notes on the following :

(i) Fractals in noise and texture generation in games.

(ii) Quadratic surfaces for generating graphical surfaces.

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is visible surface detection and back face detection ? Explain in brief the Depth buffer algorithm.

(b) Discuss ambient light and diffuse reflection model in detail. How is phong shading implemented using shader programs leveraging the power of a gpu ?

(c) What is ray casting algorithm ? Explain in detail how ray casting algorithm generates realistic graphics. Explain why rasterization is preferred over ray casting.