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MCS-053

04261

MCA (Revised)

Term-End Examination

December, 2011

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 hours *Maximum Marks : 100*

Note : *Question number **1** is **compulsory**. Attempt **any three** from the rest.*

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1. (a) What are the purpose of using the following file formats ? **5**

(i) TIFF

(ii) PNG

(iii) JPEG

(iv) BMP

(v) CDR

(b) Write the DDA algorithm for line generation and modify the same for negative sloped lines. **5**

(c) List two main differences between the following : **5**

(i) Cohen Sutherland line clipping algorithm and cyrus beck line clipping algorithm

(ii) Scan line polygon filling algorithm and flood fill algorithm.

(d) Perform 45° rotation of a ΔABC; A (0,2), B (−1,−1), C(1,−1) about the origin 5

(e) What do you mean by Foreshortening factor ? How foreshortening factor is used to identify that projection is isometric, Dimetric or Trimetric ? 3

(f) What is the utility of tabular representation of polygon surface ? Can you implement a polygon surface with just a vertex table and an edge table ? Justify your answer. 4

(g) What are the maximum number of objects that can be handled by the Z-buffer algorithm ? What will happen if Z-buffer algorithm is used and it is found that two polygons have same Z-value ? 4

(h) What are the merits and demerits of phong shading ? 4

(i) Explain the following :

(i) Stochastic Animation and its area of application 5

(ii) Image editing tools and their selection criteria

2. (a) Differentiate between 5

(i) Caligraphic display device and Raster Scan display device

(ii) Drawing and Painting

(b) Write the Mid point circle generation algorithm and use the same to produce a circular arc of radius 8 units in the first quadrant from $x = 0$ to $x = y$. 8

(c) Explain all the four cases of the Sutherland - Hodgman polygon clipping algorithm. 5

(d) Determine the number of memory bits required for a 4 bit - plane frame buffer for a 512 × 512 raster. 2

3. (a) Determine the final coordinates of a polygon ABCD, A (1,4), B (−4,1) C (−1,−1), D (2,−2) when it is scaled up to twice its size with respect to an arbitrary point P (1,1). 5

(b) Find the condition under which we have : 5

$Ss_x s_y . R_\theta = R_\theta . Ss_x s_y$

Where $Ss_x s_y$ is scaling with scaling factors S_x and s_y in x and y direction respectively and R_θ is rotation with an angle θ.

(c) Obtain a transformation matrix for perspective projection for a given object onto $x = 5$ plane, as viewed from (10,0,0) 5

(d) Define a projection. Give the various types (taxonomy) of projection 5

4. (a) A Cubic Bezier curve has control points P_0 (0,0); P_1 (5,40); P_2 (40,5); P_3 (50,15). Determine 2 more points on the same Bezier curve. 5

(b) Explain the scan line method of visible surface detection in computer graphics. 5

(c) Explain the generation of surface of revolution with the help of an example. 5

(d) How Ambient, Diffused and specular reflection contributes to the resulting intensity of reflected ray of light ? Give mathematical expression for the same. 5

5. (a) Differentiate between (*Any two*) 5

(i) Frame animation and Sprite Animation

(ii) Scripting Systems and Parameterised Systems

(iii) Computer generated and Computer Assisted Animation.

(b) What do you mean by simulating acceleration in animation ? What type of acceleration will be simulated by a straight line function ? Draw suitable graph for the mathematical function used to describe the frame spacing regulation when positive acceleration is desired to be produced. 5

(c) Differentiate between 5

(i) Analog sound and Digital sound

(ii) Lossless Audio formats and Lossy Audio formats

(d) List the characteristics of any two types of authoring tools. 5