KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

MCA 3rd Sem. Examination, 2014

Paper : 12

Computer Graphics

Time : 3 Hrs. Full Marks : 80

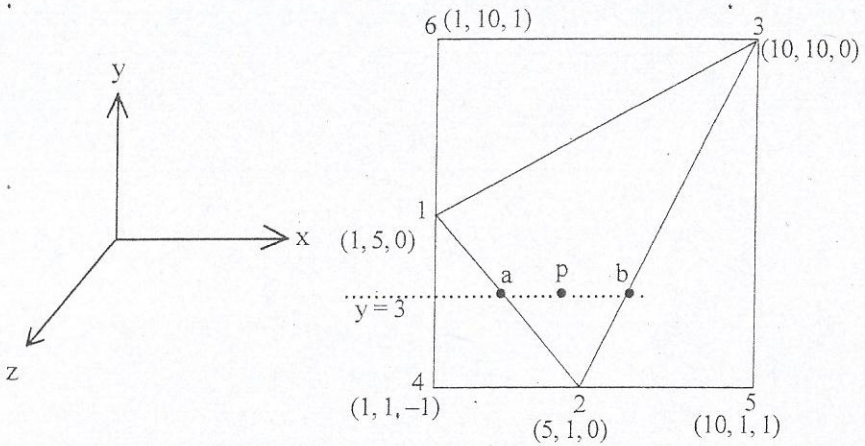
1. Answer any five from the following questions $2\times5 = 10$
   (a) What are the different resolution schemes used in video display device?
   (b) Differentiate between image resolution and dot pitch.
   (c) Define cell array.
   (d) How a regular curve is different from irregular curve?
   (e) State the basic principles of reflection transformation.
   (f) What is the disadvantages of Gouraud Shading?
   (g) What is approximated spline?

2. Answer any three from the following questions $4\times3 = 12$
   (a) How is line drawing algorithms developed?
   (b) When an alaising problem occurs? What is the solution for alaising problem?
   (c) Define matrices. How is the matrix representation of translation, scaling and rotation represented as?
   (d) What is shading? What are different types of shading?
   (e) Write homogenous matrix for reflection about the straight line y = x and y = –x

3. Answer any three from the following questions $6\times3 = 18$
   (a) Write the pseducode for rasterizing a line as per DDA logic.
   (b) Explain the concept of general pivot point rotation. Differentiate it with general fixed point scaling.
   (c) Explain the Sutherland-Hodgeman algorithm for polygon clipping.
   (d) Which factors determine the resolution of a CRT monitor? What is the typical resolution of a high quality system?
   (e) What is viewing pipeline? Describe the mechanism that are involved in a viewing pipeline. How does window to viewport

conversion is performed?

4. Answer any three from the following questions $10\times4 = 40$
   (a) Write a program to draw a circle using Bresenham algorithm.
   (b) Find the normalization transformation N which uses the rectangle W(1, 1), X (5, 3), Y(4, 5) and Z(0, 3) as a window and normalized device screen as the view port.
   (c) Consider the segment of a surface shown in the figure. The coordinates of the vertices of the four planes are given below



   A single point light source is located at positive infinity of Z axis and assume the vector to the eye as V'[111]. Also assume d = 0, K=1, $I_a = 1$, $I_l = 10$, $n_s = 2$ $k_s = 0.8$, $k_d = k_a = 0.10$ for use in a simple illumination model. Find out the intensity of light reflected from the mid point p on scan line y=3 in triangle 1 - 2 - 3 for

   (i) Constant Shading and (ii) Gouraud Shading

   (d) Describe virtual environment display. Why it is being used? What are the three phases that a virtual environment is passed through?

   (e) Explain various clipping operations with the help of example.

   (f) Describe the various 3D transformation functions.