



Course: IT604B- Computer Graphics

PROGRAMME: INFORMATION TECHNOLOGY	DEGREE: B. TECH
COURSE: Computer Graphics	SEMESTER: 5 CREDITS: 3
COURSECODE: IT604 B	COURSE TYPE: Theory
COURSE AREA/DOMAIN: Mathematics, Algorithms	CONTACTHOURS: 3 (weekly)
CORRESPONDING LAB COURSE CODE (IF ANY): NA	LAB COURSE NAME: NIL

Assignment Set I

S. NO.	Question	Assesses CO
1	Write a program to implement DDA line drawing algorithm.	CO.1
2	Write a program to implement Bresenham's line drawing algorithm Compare the execution time of DDA and Bresenham's line drawing algorithm . Compare the execution time of these two	CO.1
3	Write a program to implement Bresenham's circle drawing algorithm	CO.1
4	Write a program to draw line graph and bar graph for the given sets of input. Data may range from 0.0001 to 500000.	CO.2
5	Write a program to implement seed fill algorithm	CO.3
6	Write a program to implement scan line polygon fill algorithm	CO.2
7	Write a program to implement explicit 2-D clipping algorithm	CO.2
8	Write a program to draw cubic bezier curve	CO.2
9	Write a program to generate the fonts in Bengali string using Bezier Curve to print your name	CO.1
10	Draw a triangle and apply the following sequences of transformation on the object and show the intermediate transformed figure (introduce delay between any two displays) to achieve the final transformed figure a. Reflect the object around any arbitrary line $y=mx+c$ b. Then rotate it by 180 degree keeping the top most vertex fixed. c. Translate it along the x-axis by $tx=20$ d. Then rotate it by 180 degree keeping the top most vertex fixed. e. Scale it by $sx=2, sy=2$ about the centroid of the object	CO.3
11	Draw a real clock with hours, minutes and seconds hands rotating around to count exact time	
12	Draw the two-point perspective projections of a house and tilt it towards they y-axis	
13	Simulate the solar system. Tips: you may simulate the sky by coloring the substantial portion of the screen with blue and randomize the stars	
14	Draw the persepective projections of a cuboid and rotate it by 90 deegree	



Assignment Set II

S. NO.	Question	Assesses CO
1	a) What is homogeneous co-ordinate system? b) What is 2D Affine transformation? Discuss various 2D transformations in homogeneous co-ordinate system. c) Discuss transformation from one coordinate system to another coordinate system.	CO.4
2	a) Describe composite transformation with an example. b) Describe the transformation that rotates an object point $P(x, y)$ about a fixed center of rotation $P(h, k)$. c) Show that the order in which transformations are performed is important by applying the transformation of triangle $A(1,0)$, $B(0,1)$, $C(1,1)$ by i) rotating 45 about the origin and then translating in the direction of vector $I(1,0,0)$. ii) translating in the direction of vector I first then rotating 45 about origin	CO.2 CO 4
3	a) Describe scaling. Compare and contrast scaling and shear. b) Magnify the triangle with vertices $A(0, 0)$, $B(1, 1)$, $C(5, 2)$ to twice its size while keeping $C(5,2)$ fixed c) Reflect the diamond shaped polygon whose vertices are $A(-1,0)$, $B(0, -2)$, $C(1, 0)$ and $D(0,2)$ about the line $y = x+2$	CO.2
4	a) What is pixel? What do you mean by scan conversion? b) Distinguish between raster graphics and vector graphics. c) Discuss the DDA algorithm to generate a straight line.	CO.2
5	a) Distinguish between window and viewport. What is viewing transformations? Obtain the required transformation matrix. b) Find the normalization transformation N which uses the rectangle $A(1, 1)$, $B(5, 3)$, $C(4, 5)$ and $D(0, 3)$ as a window and the normalized device screen as a viewport.	CO.3
6	a) Describe World Coordinate (WCS), Physical Device Coordinate (PDCS), Normalized Device Coordinate System (NDCS) and Viewing transformation. b) What is aspect ratio? What is its significance in viewing transformation? c) Find the normalization transformation that maps a window whose lower left corner is at $(1, 1)$ and upper right corner is at $(3, 5)$, onto a viewport that is the entire normalized device screen.	CO.3
7	a) Describe and write Bresenham's line drawing algorithm. b) A line is to be drawn on the screen starting from $(2, 4)$ to $(9,9)$. Using Bresenham line drawing algorithm determine the pixels which would be put up on the screen. c) Which line drawing algorithm - DDA or Bresenham is efficient? Justify.	CO.2
8	a) Describe basic transformations in 3D.	CO.1



- b) Obtain the matrix for general rotation through an angle θ with respect to the axis of rotation A(x_1, y_1, z_1) B(x_2, y_2, z_2).
- c) Describe viewing pipeline
- 9 a) Discuss and write midpoint circle drawing algorithm. CO.1
b) Discuss how ellipse-drawing algorithm differs from circle drawing algorithm.
- 10 a) Compare and contrast geometric and parametric curves. CO.2
b) What do you mean by approximated spline and interpolating spline?
c) Describe continuity conditions for joining splines. Why piece wise cubic curves are preferred than a single higher degree curve for a given set of control points?
d) State main differences between B'ezier spline and B-Spline.
- 11 a) Describe the role of blending functions in modeling curves. CO.2
b) Obtain parametric forms of cubic Bezier curves
c) Find the equation of the Bezier curve which passes through points (0,0) and (-2,1) and is controlled through points (7,5) and (2,0). Draw the rough sketch of the curve.