SCHOOL OF ENGINEERING, CUSAT

B. TECH DEGREE FIRST INTERNAL EXAMINATION December 2022

Semester V Course Title: CS 19-202-504 Computer Graphics

Faculty: Dr Latha R Nair

Time: 2Hrs

Max. Marks: 50

CO1	Explain the organisation of an interactive computer graphics system.
CO2	Generate 2D and 3D geometrical objects.
CO3	Explain the important transformations on graphical objects.
CO4	Fill a region given boundary and clip lines and polygons against a rectangular boundary.
CO5	Describe the different types of curves and generate curves.
CO6	Apply the operations like projections and rendering for 3D picture generation.
CO7	Design graphical objects.
CO8	Design interactive graphics systems and animation systems.

BL-Bloom's taxonomy levels(L1-Remember, L2-Understand, L3-Apply, L4-Analyze L5-Evaluate L6-Create),CO-Course outcome
PO- programme outcome

PART A- Answer all questions (5x4=20)

			BL	CO	PO
I	a	i)Write the differences between flood fill and boundary fill. (1mark)	2	4	1,12
		ii)Explain how flood fill fills a particular area. (1mark)	2	4	1,2,3,10,12
		iii)Explain how recursive flood filling can be speeded up (1mark)	4	4	1,2,3,10,12
		iv)Can scanline filling be used for filling arbitary curved shapes?? Justify your answer (1mark)	2	4	1,2,3,10,12
	b	i)Write the fundamental equations in DDA algorithm. (2marks)	2	2	1,2,3,10,12
		ii)How much computational efficiency is achieved through these	4	2	1,2,3,10,12

		equations? (1marks)			
		iii)What is the disdvantage of this algorithm? How this can be solved? (1marks)	2	2	1,2,3,10,12
	c	Explain the two types of display devices (4marks)	1	1	1,12
	d	Write the transformation rotation about reference point (xr, yr) i) in equation form . Explain the equation (2marks)	2	3	1,2,3,10,12
		ii) in matrix form. Explain how did you arrive at the matrix representation? (1 marks)	2	3	1,2,3,10,12
		iii)What is the use of matrix representation of transformations (1 marks)	2	3	1,2,3,10,12
	e	Derive the blending function for a bezier curve with 3 control points. (4marks)	3	5	1,2,3,10,12

PART B -Answer Any three questions (10*3=30)

II	a. i) Draw the circle symmetry. (2 marks)	2	2	1,2,3,10,12
	ii)How this can be used in reducing time for cirle drawing ? (1 marks)	4	2	1,2,3,10,12
	iii) Compare this with symmetry of ellipse. (1 marks)	4	2	1,2,3,10,12
	iv) Explain the steps in midpoint circle drawing? How the decision for next point is made at every step? (3marks)	1	2	1,2,3,10,12
	v). Compute the first three points in a circle with radius 5 and centre (10,30) using midpoint circle drawing. (3 marks)	3	2	1,2,3,10,12
III	i) Explain the difference between scaling about origin and scaling about a reference point with suitable diagrams (2marks)	2	3	1,2,3,10,12
	ii) Calculate the final rotated point after rotating the point (50,60) about (10,20) anticlockwise 45degrees (4 marks)	3	3	1,2,3,10,12
	Iii) Explain how reflection of a point can be performed about	2	3	1,2,3,10,12

	arbitary axis. Give a sample diagram to show the sequence of transformations (4 marks)			
IV	i. Explain the steps in polygon clipping (4 marks)	2	4	1,2,3,10,12
	ii. A line (10,20) (100,160) and a window with boundary (50,50)(80,100) are given. Use Cohen Sutherland algorithm to find: (a) the codes of the end points. What each bit of the code means? (3 marks)	2	4	1,2,3,10,12
	(b) Show the steps to find any one of the end points of the clipped line for the line in question (a). (3 marks)	3	4	1,2,3,10,12
V	i) What are the features for selecting a specific spline curve (2 marks)	4	5	1,2,3,10,12
	ii) What is a knot vector in a B spline? (2 marks)	2	5	1,2,3,10,12
	iii) Write a sample knot vector for a uniform periodic Bspline with 4 control points and degree parameter d=3. (3 marks)	2	5	1,2,3,10,12
	iv). Calculate the final clipped line end points using Liang Barsky clipping algorithm of the line (10,20) (100,160). The window boundaries are (50,50)(80,100) (3marks)	3	4	1,2,3,10,12

L1=16% L2=56% L3=20% L4=8% L5= % L6=%