Lumbini Engineering, Management & Science College

Final Internal Exam

Level: Bachelors Degree | Year: 2024
Program: Computer 3rd sem. | Full Mark:100
Course: Computer Graphic | Pass Mark: 45

Attempt all the questions

1.a) What is Computer graphics? What is the role of graphics is medical field? (7)

b) Difference between raster scan- display and random-scan display. (8)

2.a) Rasterize the points of given line end points A (-2, -4) and B (-6, -9) using Biesenhom's line drawing algorithm. (8)

b) Translate a triangle ABC with co-ordinates A(0,0), B(5,0) and C(5,5) by 2 unit in X- direction and 3 unit in Y- direction. (7)

3.a) On an average it takes 20 nano sec for a Raster Graphics system to access the pixel value from the frame buffer and glow the phosphor dot on the screen. If the total resolution of the screen is 640*480 will this access rate produce a flickering effect? (8)

OR

Digitize the octant of the circle with radius =7 and Center (20,30) using Mid- point circle drawing algorithm.

b) What is projection? Differentiate Parallel Projection with perspective projection. (7)

4.a) Differeciate RGB color Model with CMYK. (7)

b) Clip the Polygon A (100, 150), B (200, 25) and C (300, 200) with the clipping window defined by the co-ordinate (100, 300), (300, 300) and (300, 100) and (100, 100) using Cohen- Sutherland polygon. Clipping Algorithm. (8)

5.a) What is Bezier curve? Derive Bezier curve equations using 3 control points. (7)

b) What is illumination? Difference between Gouraud shading and Phong shading. (8)

6.a) What is buffer? Explain Z- buffer, A – buffer. (7)

b) What is open GL? What are its primitives? (8)

7. Write short notes on any two. (2*5=10)

a) Ambient light
b) Fast Phong Shading
c) 3D translation
d) Video controller

National Academy of Science and Technology

(Affiliated to Pokhara University)
Dhangadhi, Kailali

Pre University Examination

Level: Bachelor
Programme: BE Computer
Course: Computer Graphics

Semester: Fall_III

Year : 2023
Full Marks: 100
Time : 3hrs.
Pass Marks: 45

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.
Attempt all the questions.

1. a) Explain the need and use of graphics in the field of IT. 7
   b) Explain architecture of Raster scan system with importance of video controller. 8
2. a) What is scan conversion? Derive Bresenham's line drawing algorithm for $|m|<1$. 8
   b) Derive midpoint Ellipse algorithm of region 1. 7
3. a) Why do we need clipping? Explain Cohen-Sutherland Line Clipping algorithm. 8
   b) What will be the final coordinates of a polygon with vertices A(3,4) B(5,4) C(5,2) D(3,2) after it is rotated about a 45 degree angle and fix point (2,3) ? 7
4. a) Differentiate between 2D and 3D graphics? In computer graphics which dimensional is more applicant? 8
   b) Derive quadratic cubic bezier curve. and explain the Bezier curve properties. 7
5. a) Explain Gouraud and Phong shading methods with advantages and disadvantages. 8
   b) What is ambient light and various light reflection? Derive illumination model. 7
6. a) Explain about GKS and different kinds of graphics file formats. 8
   b) What are the drawing basic output primitives of openGL API? 7

7. Write short notes on following **(Any Two)** 5x2
   a) Video controller
   b) DDA
   c) Visualization of Data set

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UNITED TECHNICAL COLLEGE
Semester- Fall

Level: Bachelor
Programme: BE
Course: Computer Graphics

Year : 2023
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt any three questions from (1-6) and Q.N. 7 is compulsory.

1	a)	What are the differences between computer graphics and image processing? Discuss the major application areas of computer graphics.	8
	b)	Consider two raster systems with resolutions of 640x840 &1280x1024. How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second? What is the access time per pixel in each system?	7
2	a)	Compare raster scan display system with vector scan display system along with their architectures.	8
	b)	Describe how color pixel is displayed in a computer system?	7
3	a)	Digitize first quadrant of a circle by using midpoint circle generation algorithm center at (4, 3) and radius is 10.	8
	b)	Derive an equation for drawing a line using Bresenham's algorithm for slope less than one.	7
4	a)	Rotate the triangle A (2, 3), B (5, 3) and C (3, 1) about a fixed point (1, 2) by 30^0.	7
	b)	How can you derive a composite transformation matrix for rotating an object in 3D about any arbitrary plane? Write down matrix for each transformation steps.	8
5	a)	Derive a transformation matrix due to perspective projection.	8
	b)	What is control points? Derive a matrix for cubic Bezier curve.	7

6 a) Compare object space method with image space method Explain scan line algorithm for detecting visible surfaces with suitable figure. 4+4

b) Explain the difference between Gouraud and Phong interpolation for the simulation of smooth shading across faceted surfaces. Use a diagram to assist in your explanation. 7

7 Write short notes on: **(Any One)** 1×5

a) RGB Color Model

b) Homogenous Co-ordinates

c) 3D Viewing Pipeline

d) GKS, PHIGS, OpenGL

Pokhara University

Everest Engineering College

Final Internal Assessment
Fall-2023

Level: Bachelor — **F.M. 100**
Program: BE CMP — **P.M. 45**
Faculty: Science & Technology — **Time: 3hrs**
Subject: Computer Graphics (3rd Semester)

Attempt all the questions.

1	a)	Explain the working principle of LCD and LED.	4-
	b)	Explain frame buffer. Calculate the access time for a pixel and row for a graphics system having resolution of 1024*640 and frequency of 60Hz.	2+
2	a)	Rasterize the points of given line end points A(2,3) and B(-3,-5) using Bresenham's line drawing algorithm.	8
	b)	While scan converting an ellipse, how do you know that we have reached the second region of the first quadrant of the ellipse? Explain with expressions.	7
3	a)	What will be the final co-ordinate of a polygon with vertices A(3,4) B(5,4) C(5,2) D(3,4) after it is reflected about a line $y = 2x + 1$?	7
	b)	Explain 2D viewing pipeline. Derive transformation matrix for window to viewport transformation.	8
4	a)	Apply Cohen-Sutherland line clipping algorithm for calculating the saved portion of a line (2,4) to (13,15) in a window ($X_{min} = Y_{min} = 7$ and $X_{max} = Y_{max} = 12$).	8
	b)	Derive the composite matrix for reflection of an object about an arbitrary axis in 3D space.	7
5	a)	Define projection. Differentiate between parallel and perspective projection along with an equation.	7
	b)	Distinguish between image space and object space method. How A-buffer method removes the drawbacks of Z-buffer method.	8

a) Explain Gouraud shading and Phong shading techniques in detail with their advantages and disadvantages. 4+4

b) What is ambient light? Compare diffuse reflection with specular reflection. 7

Write short notes on: (Any two) 2*5 =10

a) Bézier Curve

b) Graphics file format

c) OpenGL

Good Luck

Subject: Computer Graphics

Candidates are required to give answers in their own words as far as practicable.
The figure in the margin indicate full marks.
Attempt all the questions

1.	a) Compare and contrast raster scan display and vector scan display architecture. b) Rasterize the circle with diameter 20 unit.	7 8
2.	a) How flood fill techniques is different from boundary fill technique? Explain with their psuedocode b) Derive a transformation matrix due to perspective projection.	8 7
3.	a) Find the transformation matrix to enlarge double of triangle size formed by coordinates A(0,0),B(1,1),C(5,2) such that point (5,2) remains same. b) Explain two dimensional line clipping algorithm with suitable example.	7 8
4.	a. Describe the rotation of an object about an axis , which is parallel to any of three coordinate axes of coordinate system. b. Explain depth sorting method for visible surface determination with suitable example.	8 7
5.	a. Develop an illumination model for a point source considering the effect of ambient light, diffused and specular reflection. b. Why it is necessary to know about fractal geometry method in computer graphics? Explain.	7 8
6.	a. Define Resolution and refresh rate . How computer graphics is different from image processing? b. Explain beam penetration and shadow mask method for color generation. c. Explain the function in OPENGL for projection and lighting.	5 5 5
7.	Write short notes on **(Any Two)** a. Recent trend in computer graphics b. RGB color model	5 × 2

COSMOS COLLEGE
OF MANAGEMENT AND TECHNOLOGY

Date: 2080/10/19		Full Marks	50
Level	BE	Time	
Programme	BCE	1.5 hrs	
Semester	III		

Term Test II

Subject: - Computer Graphics

- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Write the z buffer algorithm for detecting visible surface with its drawback and remedy.[10]

   OR

   Why clipping is needed? Apply cohen Sutherland line clipping algorithm for calculating the saved protion of a line from (2,7) to (8,12) in a window (X_{wmin} and Y_{wmin}= 5 and X_{wmax} and Y_{wmax} = 10).

2. Explain Sutherland Hodgeman polygon clipping algorithm with an example. [10]
3. Explain the 3D viewing pipeline. Explain briefly the significance of world coordinate system, viewing coordinate system, Normalized viewing coordinate system and Device coordinate system in viewing pipeline. 10]
4. Explain GKs and PHIGS. Also explain the available graphical file format [10]
5. How do you represent different objects in 3D. A mirror is placed vertically such that is passes through the points (5,0) and (0,5). Find the reflected view of the triangle ABC with coordinates A(5,30) , B(30,50) , and C (20,60). [10]

Level: Bachelor
Semester: 3rd
Subject: Computer Graphics

Full Marks: 100
Pass Marks: 45
Time: 3hrs.

Attempt all the questions.

1. a) Explain the significance of the field of computer graphics highlighting its recent trends. 7
   b) Explain different types of hardware used for graphical rendering. 8
   For a raster system with a resolution of 1280 by 1024 what is the size of frame buffer (in byte) required to store 10 bits per pixel?
2. a) Write Bresenhams line drawing algorithm along with necessary derivation for positive slope less than 1 i.e. $|m|<1$. Trace the algorithm for the line with end points A(6, 12) and B(10,15). 8
   b) What is uniform scaling? Reflect an object (2, 3), (4, 3), (4, 5) about line $y = x+1$. 7
3. a) Explain the role of composite transformation in 2D/3D geometric transformation. Explain viewing pipeline in 2D. 7
   b) Why is it required to clip lines and polygons? How can polygons be clipped. Explain. 8
4. a) How you represent different objects in 3D. Differentiate between parallel and perspective projection with example. 7
   b) Define blobby objects with example. What is cubic Bezier curve? Derive the equation of Cubic Bezier curve. 8
5. a) Why is it required to detect visible surfaces in 3D viewing? How is Back face detection technique different from Z Buffer for detecting visible surfaces? 8
   b) How can illumination model help in bringing visual realism in computer generated scenes and objects? How does phong shading approach shade a polygon surface? 7
6. a) Explain how machine independent graphical language are more preferable to develop graphical project. 7
   b) How can graphical output primitives be drawn using OpenGL API? Explain with examples. 8
7. **Write short notes on: (Any two)** **(2 x 5=10)**
   a) Polygon table
   b) Color models
   c) Data set visualization

Level: Bachelor
Semester: 3rd
Subject: Computer Graphics

Full Marks: 100
Pass Marks: 45
Time: 3hrs.

Attempt all the questions.

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   a) Polygon table
   b) Color models
   c) Data set visualization

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Gandaki College of Engineering and Science

Pokhara University

Internal Assessment-2024

Program : Computer
Level : Bachelor
Year/Part : II/I
Subject : Computer Graphics (New)

FM: 100
PM: 45
Time: 3 hr

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

1. a) Differentiate between Raster and Random Scan System with their corresponding architecture. 7

   b) Define resolution and persistence. How long would it take to load a 640 x 480 frame buffer with 12 bits per pixel, if 10^5 bits can be transferred per second? How long would it take to load 24 bits per pixel frame buffer with a resolution of 1280 x 1024 with using the same transfer rate? 8

2. a) Explain Boundary fill and Flood fill algorithm in detail. 7

   b) How decision parameter is calculated in Mid-point circle method. Show all necessary derivation. 8

   Or

   Write Bresenham's line drawing algorithm. Using this algorithm, find the intermediate pixels between the end point of the line (20,15) and (30,30).

3. a) Rotate the triangle (5,5,), (7,3), (3,3) about fixed point (5,4) in counter clockwise by 90 degree. 8

   Or

   Derive the composite matrix for reflecting an object about any arbitrary line y = mx + c.

   b) Use the Cohen Sutherland algorithm to clip a line with end point A(5,30) and B(20,60) against a clip window with lower-left corner at P1(10,10) and upper right corner at P2(100,100). 7

4. a) Explain Bezier method of curve drawing. 8

   Or

Calculate (x, y) coordinate of Bezier curve described by the following 4 control points (0,0), (1,2), (3,3), (4,0). Assume any needed values.

b) Differentiate between parallel and perspective projection. 7

5. a) Distinguish between Image space method and object space method. How A-buffer method removes the drawback of Z-buffer method? 8

b) Explain Gouraud shading and Phong shading technique in detail with their advantages and disadvantages. 7

6. a) Introduce OpenGL. Explain the program structure with OpenGL to draw a line with end points (250, 200) and (150, 150). 8

b) Explain the need for machine independent graphical languages. and also explain about GKS and PHIGS. 7

7. Write short notes on: (any two) 2x5

a) 2D transformations

b) 3D viewing transformation and pipeline

c) Color Models

The End

vel: Bach
ogramme: BE
urse: Computer Graphics (3rd sem computer)

Full Marks: 100
Pass Marks: 45
Time : 3hrs.

ndidates are required to give their answers in their own words as far as practicable.

e figures in the margin indicate full marks.

empt all the questions.

a) Define computer graphics. How are advancements in computer graphics technology influencing fields beyond entertainment, such as architecture, medicine, and scientific visualization? 7

b) In a true color system having resolution of 1024*768 having the refresh rate of 60 fps calculate the following: 8

i. Size of frame buffer
ii. Access time for one frame
iii. Access time for one pixel
iv. Access time for one row

Note: Convert your memory into Mega Byte.

a) What is scan conversion? How decision parameter is calculated in mid-point circle method. Show all necessary derivation. 8

b) Rasterize the points of given line end points A(-2, -4) and B(-6, -9) using Bresenham's line drawing algorithm. 7

OR

Explain boundary fill and flood fill algorithm in detail.

a) Scale a triangle A(0,0), B(1,1), C(3,2) by twice its original size, about origin and about point P(-1,-2). 7

b) Define window and view port? Derive the matrix that is responsible for placing an object from a window to viewport. 8

a) Calculate (x, y) coordinates of Bezier curve described by the following 4 control points (0, 0), (1, 2), (3, 3), (4, 0). Assume any needed values. 8

b) Derive a transformation matrix due to orthographic and oblique parallel projection. 7

5. a) Why is it necessary to detect visible surfaces, in case of 3D viewing? Explain Z-buffer algorithm for hidden surface removal.

b) Define lighting model and ambient light. Differentiate Phong Shading and Gouraud Shading method.

OR

What is color model? Explain RGB and CMYK color model.

6. a) Define Graphics file format. Explain Graphics Software Standards and Language Binding.

b) What are Graphical Primitives? How can graphical output primitives be drawn using OpenGL API? Interpret with examples.

7. Write short notes on: **(Any two)**

a) Cohen-Sutherland Algorithm

b) Polygon Surfaces

c) Raster vs Random Scan System

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