Tribhuvan University
Institute of Science and Technology
2067
✡

Bachelor Level/ Second Year/ Fourth Semester/ Science — Full Marks: 60
Computer Science and Information Technology (CSc. 254) — Pass Marks: 24
(Computer Graphics) — Time: 3 hours.

All questions carry equal marks.

Attempt all questions.

1. What is a computer graphics? Explain in detail about the application of computer graphics.
2. Derive the window to viewport transformation coefficient matrix. Explain the application of this matrix.
3. Explain the following term with practical applications.

   a) 3D Rotation
   b) 2D Shear

4. Explain in detail about line clipping algorithm and its applications.
5. What is a digital differential analyzer (DDA)? How can you draw the line using this algorithm?
6. How can you represent 3D object? How can you draw the line using this algorithm?
7. How curves be generated? Explain it with any suitable algorithm.
8. Explain in detail about plain equation method. Explain which algorithm is better for hidden surface removal.

   OR

   Explain in detail about depth buffer method. Justify that is better than plane equation method.

9. Consider 256 pixel X 256 scan lines image with 24-bit true color. If 10 minutes video is required to capture, calculate the total memory required? Why intensity assignment is required?
10. Why shedding is required in the computer graphics? Explain in detail about constant intensity shading.

    OR

    List the different type of shading models. Explain in detail about Gouraud shading model.

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Attempt all questions.

1. What is a random scan display system? Draw its block diagram and explain it in detail.

2. What do you mean by homogeneous coordinates? Explain it with equation and practical application.

3. Explain the following terms with practical applications.
   a. 3D Mirror
   b. 2D Rotation

4. Explain in detail about circle clipping algorithm. Where do you require circle clipping algorithm?

5. How can you draw circle? Explain with algorithm.

6. Explain in detail about polygon table. How can you apply in the case of computer animation?

7. What is a polygon mesh? Explain the application of polygon mesh with example.

8. Justify that hidden surface removal is required in computer graphics. Explain in detail about depth buffer method.

OR

Explain in detail about scan line method. Just that it is better than depth buffer method.

9. Consider 256 pixels X 512 scan lines image with 24-bit true color. If 20 minutes video is required to capture, calculate the total memory required? What is the color intensity model?

10. Explain in detail about Phong shading. How can you modify Phong shading model?

OR

Explain in detail about Gourand shading model. Compare it with Phong shading model.

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Candidates are required to give their answers in their own words as for as practicable.
All questions carry equal marks.

Attempt all the questions.

1. What is a raster scan display system? Draw its block diagram and explain it in detail.

2. How can you represent 3D viewing? Explain it with equation and practical application.

3. Explain the following terms with practical applications.

   (a) 3D Translation
   (b) 2D Mirror

4. Where do you require ellipse clipping algorithm? Explain in detail about ellipse clipping algorithm.

5. How can you draw circle? Explain it with algorithm.

6. Explain in detail about polygon table. How can you apply in the case of virtual reality?

7. What do you mean by solid modeling? Explain the process for solid modeling with example.

8. Hidden surface removal is required in computer graphics is very important, justify it. Explain in detail about scan line method.

   OR

   Explain in detail about scan line method. Justify that it is better than plane equation method.

9. Consider 1024 pixels X 1024 scan lines image with 24-bit true color. If 10 minutes video is required to capture, calculate the total memory required? How can you incorporate shadow in the computer graphics?

10. Differentiate between diffuse reflection and specular reflection. Why do we require shading model? Explain it.

    OR

    Explain in detail about Phong shading model. Compare it with Gouraud Shading model.

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2069
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Computer Science and Information Technology (CSc. 254) — Pass Marks: 24
(Computer Graphics) — Time: 3 hours.

All questions carry equal marks.

Attempt all questions.

1. Explain the random scan display system with its advantages and disadvantages.
2. Why homogeneous coordinate are used for transformation computations in computer graphics? Explain.
3. Differentiate between window port and view port. How are lines grouped into visible, invisible and partially visible categories in 2D clipping? Explain.
4. Define polygon. What are the different types of polygons? Explain with example.
5. Differentiate between periodic B-spline curves and non-periodic B-spline curves.
6. Explain the z-buffer algorithm for removing hidden faces?
7. Differentiate between incremental algorithms over DDA with example.
8. Define the following terms (any two):
    a) Video controller
    b) 3D viewing
    c) Raster graphics
    d) List priority
9. Explain the simple illumination model with example.

OR

Explain the Gourand shading model with example.

10. Explain the virtual reality and its applications in the computer graphics.

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Bachelor Level/ Second Year/ Fourth Semester/ Science
Computer Science and Information Technology (CSc. 254)
(Computer Graphics)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

All questions carry equal marks.

Attempt all questions.

1. What is the random scan system? Explain the operation of random scan with architecture.
2. Write a procedure to fill the interior of a given ellipse with a specified pattern.
3. Show that two successive reflection about any line passing through the coordinate origins equivalent to a single rotation about the origin.
4. What do you mean by line clipping? Explain the procedures for line clipping.
5. Illustrate the windows to view point transformation with an example.

OR

Write a procedure to implement highlighting as a blinking operation.

6. Why polygon description is consider as standard graphics objects? Explain the importance of polygon table.
7. Model the Bezier curve. Explain the importance of Bezier curve in graphical modeling.

OR

Write a procedure to perform a two-point perspective projection of an object.

8. What is solid modeling? Explain the basic procedures for solid modeling.
9. Explain the area subdivision method for visible surface detection.
10. Explain the basic steps for computer animation.

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Computer Science and Information Technology (CSc.254) — Pass Marks: 24
(Computer Graphics) — Time: 3 hours

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. Define a computer graphics and its applications.
2. Explain the scan conversion algorithms with example.
3. Explain the 2D and 3D transformations.
4. Explain the window to view port transformation with its applications.
5. Explain with algorithm of generating curves.
6. Set up a procedure for establishing polygon tables for any input set of data points defining an object.
7. Define the algorithms for visible surface detection.
8. Define the following terms (**any two):**
    a) 3D viewing
    b) Polygon Messes
    c) Boundary Representation
    d) Sweep Representation
9. Explain the visible surface detection with an algorithms.
10. What do you mean by virtual Reality and animation? Explain.

OR

Explain the scan line algorithms with example.

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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. What is a computer graphics? Briefly explain the applications of computer graphics.
2. Use Bresenham's algorithm to draw a line having end points (25, 20) and (15, 10).
3. Construct the Bezier curve of order 3 and 4 polygon vertices A(1,1) B(2,3) C(4,3) and D(6,4).
4. Derive the Mid-point algorithm.
5. Differentiate flood fill and boundary fill method?
6. Explain the following term with practical applications.
   a) 2D shearing
   b) 3D viewing
7. What do you mean by homogeneous coordinates? Rotate a triangle A(5,6), B(6,2) and C(4,1) by 45 degree about an arbitrary pivot point (3,3).

OR

Explain in detail about Diffuse Reflection model.

8. What is projection? Differentiate between parallel and prospective projection.
9. Given a clipping window P(0,0), Q(30,20), S(0,20) use the Cohen Sutherland algorithm to determine the visible portion of the line A(10,30) and B(40,0).
10. Explain the basic steps for computer animation and its application in computer science.