

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
June 2018

Mark Scored:

Level : B.E.

Year : III

Course : COMP 342

Semester: I

Exam Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

Date

JUN 10 2018

SECTION "A"

[20 Q.×0.5=10 marks]

Tick (✓) the best answer(s) or fill in the blanks with most appropriate word/phrase.

- The application of computer graphics that allows artists to paint pictures on the screen of video monitor is \_\_\_\_\_.  
 Visualization  Computer Art  
 Presentation Graphics  Engineering and manufacturing
- If you are drawing a circle with radius 6.5 and center at (100,100) using midpoint algorithm then the initial decision parameter  $P_0$  is \_\_\_\_\_  
 -5.5  -5.25  -5  -6
- A line connecting the points (4, 6) and (1, 2) is to be drawn, using DDA algorithm. Find the value of stepsize (counter value till when calculation will be carried out)  
 3  -3  4  -4
- Which digitizer uses microphones to detect the sound emitted by an electrical spark from a stylus tip?  
 Optical  3D  Acoustic  Electrical
- In beam-penetration color CRT monitors, a beam of fast electrons shows \_\_\_\_\_ color  
 Orange  Yellow  Red  Green
- A raster color display processor supports a resolution of 1024 x 800 with up to 16 million colors simultaneously displayable. What will be the approximate size of frame buffer (in bytes) used in the display processor?  
  $1.2 \times 10^6$    $2.5 \times 10^6$    $16 \times 10^6$    $10^6$
- While Clipping the line using Liang-Barsky line clipping algorithm with endpoints A(2, 3) B(8, 4) against a window (1, 2, 9, 8), what will be the value of  $q_2$ ?  
 -1  7  5  1
- If you rotate the point (20, 30) by 90 degrees anticlockwise and then translate it by (-20, 0) and then scale it by (2, 1), where will the point be?  
 (100,-20)  (100, 10)  (100, 20)  (-100, 20)
- A transformation that slants the shape of an object is called \_\_\_\_\_  
 Reflection  Shear  Scaling  Rotation

10. In displaying a clipped picture the efficient method is?  
 Clipping against the window and then applying the window transformation  
 Applying window transformation and then clipping against the viewport  
 Both of the above given options have same efficiency  
 Efficiency depends on whether the window is an aligned rectangle or not
11. The reflected 3D point  $(x, y, z)$  relative to the  $xy$  plane is \_\_\_\_\_  
  $(-x, -y, z)$         $(x, y, z)$         $(x, y, -z)$         $(x, -y, -z)$
12. Engineering drawing commonly applies?  
a) Oblique projection  
b) Orthographic projection  
c) Perspective projection  
 a       b       c       a & b
13. While performing 3D rotation along  $z$ -axis in clockwise direction, the  $x$ -coordinate is calculated as:  
  $x \cos\alpha - y \sin\alpha$         $x \sin\alpha - y \cos\alpha$   
  $x \cos\alpha + y \sin\alpha$         $x \sin\alpha + y \cos\alpha$
14. Coordinate values for each vertex is stored in \_\_\_\_\_  
 Vertex table       Edge table  
 Surface table       Location table
15. In diffuse reflection, if the angle between the unit normal vector to a surface and unit direction vector to the point light source is increased, then the brightness of spot \_\_\_\_\_  
 drops       increase  
 doesn't Change       depend on material properties
16. What is the Maximum number of overlapping objects that can be handled by using the  $Z$ -buffer algorithm?  
 Single object       Two object  
 Multiple object       Two opaque object
17. Which hidden surface removal method takes care of both opaque surfaces as well as transparent surfaces?  
 Back face removal method        $Z$  buffer method  
 Scan line method       A buffer method
18. Let  $R$  be the unit vector in the direction of specular-reflection,  $L$  be the unit vector directed toward the point light source,  $N$  be unit normal surface vector and  $V$  be the unit vector pointing to the viewer from the surface position. The specular-reflection is obtained when  
  $L \cdot N = 0$         $L \cdot R = 0$         $L \cdot V = 0$         $R \cdot V = 0$
19. The intersection of primary CMYK color produces  
 White color       Black color       Cyan color       Magenta color
20. Which steps of animation sequence defines the motion sequence as a set of basic events that are to take place?  
 Storyboard layout       Object definitions  
 Key-frame specifications       Generation of in-between frames

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Semester: I  
F.M. : 40

SECTION "B"

[6 Q.×4=24 marks]

*Attempt any SIX questions.*

1. List six different applications of Computer Graphics? Describe the role of computer graphics while designing the Graphical User Interface with suitable examples? [1+3]
2. Differentiate between Raster and Random display system? Describe Shadow Mask method for generating color in raster display systems with suitable diagram? [2+2]
3. What are the advantages of using homogeneous coordinate systems compare to Cartesian system? Derive the necessary transformation equations for rotating a point  $P(x, y)$  by  $\theta^\circ$  with reference to a point  $(x_r, y_r)$  [1+3]
4. Differentiate between window and viewport in 2D viewing? Clip the line with coordinates  $L1(-1,5,3,8)$  against a rectangular window with dimension  $R(-3,1,2,6)$  using Cohen-Sutherland line clipping algorithm. [1+3]
5. What is image space method? Explain back face detection algorithm with supporting mathematical relations? [1+3]
6. Describe Constant Intensity Shading with relevant example? Differentiate between Gouraud Shading and Phong shading? [3+1]
7. Write Short notes on: [2+2]
  - a. Key-Frame Systems
  - b. Storyboard layout in Design of animations

SECTION "C"

[8 Q.×2=16 marks]

*Attempt all questions.*

8. Derive all the required decision parameters for drawing a Region-1 of an ellipse (Starting from  $(0, r_y)$ ) using Midpoint algorithm. Digitize a line with end points (20, 10) and (28, 22) using Bresenham line drawing algorithm? [5+ 3]
9. A) Explain 3D viewing pipeline with suitable example to illustrate the transformation performed in each stage? Prove that uniform scaling and a rotation form a commutative pair of operations but that, in general, scaling and rotation are not commutative pair? [3+2]  
B) Determine the form of the transformation matrix for a reflection about an arbitrary line with equation  $y = mx + b$ ? [3]



1/1/2025

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