

T. Y. B. C. A. Semester 6
Effective From: June 2013.

Paper No.: 601 (Core Paper-1)
Paper Title: Computer Graphics

Teaching Hours: 4 Hrs./Week
Credits: 4

Prerequisite: Basic concepts of computer based animation, various objects and basic school geometry.

Aim: To make students understand and learn the geometrical processes on various shapes, objects & text.

Expected Outcome: Students will be able to understand and write algorithms for construction of various shapes like line, circle & ellipse, and also various processes on them.

1. Graphics Systems

- 1.1. Application Areas of Graphics Systems
 - 1.1.1. Presentation Graphics
 - 1.1.2. Entertainment
 - 1.1.3. Education & Training
 - 1.1.4. Image Processing
- 1.2. Application Areas of Computer Graphics
 - 1.2.1. Computer Graphics Files
 - 1.2.2. Raster Graphics and Vector Graphics
- 1.3. Video Display Devices
 - 1.3.1. Refresh CRT
 - 1.3.2. Color CRT
 - 1.3.3. LCD
- 1.4. Random Scan Display
- 1.5. Direct View Storage Tube
- 1.6. Introduction to graphic standards
- 1.7. Concepts of various objects: Point, Line, Circle, Ellipse and Polygons

2. Line generation

- 2.1. Geometry of line
- 2.2. Frame Buffer
- 2.3. Line Drawing Algorithms
 - 2.3.1. DDA Algorithm
 - 2.3.2. VECGEN
 - 2.3.3. Bresenham
- 2.4. Line Styles
 - 2.4.1. Thick line
 - 2.4.2. Line caps

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- 2.4.3. Thick line segments
- 2.5. Anti aliasing of line

3. Polygons

- 3.1. Polygon Representation
 - 3.1.1. Polygon Inside Tests
 - 3.1.2. Even-odd method
 - 3.1.3. Winding number method
- 3.2. Polygon Area Filling Algorithms
 - 3.2.1. Flood Fill
 - 3.2.2. Scan Line
 - 3.2.3. Boundary Fill
 - 3.2.4. Filling polygon with a pattern

4. Geometric Transformations

- 4.1. Basic Transformations
 - 4.1.1. Scaling
 - 4.1.2. Translation
 - 4.1.3. Rotation about origin
 - 4.1.4. Rotation about Homogeneous Coordinates
 - 4.1.5. Shearing

References :

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|---|---|---------------------------------|---------------------|
| 1 | Computer Graphics, Second Edition | Donald Hearn & M. Pauline Baker | Prentice Hall India |
| 2 | Computer Graphics | Harrington S | Tata McGraw Hill |
| 3 | Computer Graphics | Desai A.A | PHI |
| 4 | Computer Graphics: Algorithms & Implementations | Mukherjee & Jana | PHI |
| 5 | Interactive Computer Graphics | Giloi W.K | Prentice Hall India |
| 6 | Principles of Interactive Computer Graphics | New Man W. & Sproul P.F. | McGraw Hill |
| 7 | Procedural Elements for Computer Graphics | Rogers D.F. | McGraw Hill |