MANIPAL UNIVERSITY

THIRD SEMESTER MSc. INFORMATION SCIENCE
DEGREE EXAMINATION – NOVEMBER 2015

SUBJECT: CIS 653 – COMPUTER GRAPHICS

Wednesday, November 25, 2015

Time: 10:00 – 13:00 Hrs.   Max. Marks: 100

1. Apply Bresenham's line drawing algorithm to plot the line with end points $P_0 = (20, 10)$ and $P_1 = (30, 18)$ for $|m| < 1$.

(10 marks)

2. Describe the midpoint ellipse drawing method for region 1 and obtain the decision parameter values P_k and P_{k+1}.

(10 marks)

3. Obtain the transformation matrix and show the sequences to generate rotation of an object about any selected pivot point (x_r, y_r) in the 2D system.

(10 marks)

4. Prove that the multiplication of transformation matrices for each of the following sequence of operations is commutative in 2D system.
4A. Two successive rotations.
4B. Two successive translations.

(10 marks)

5.
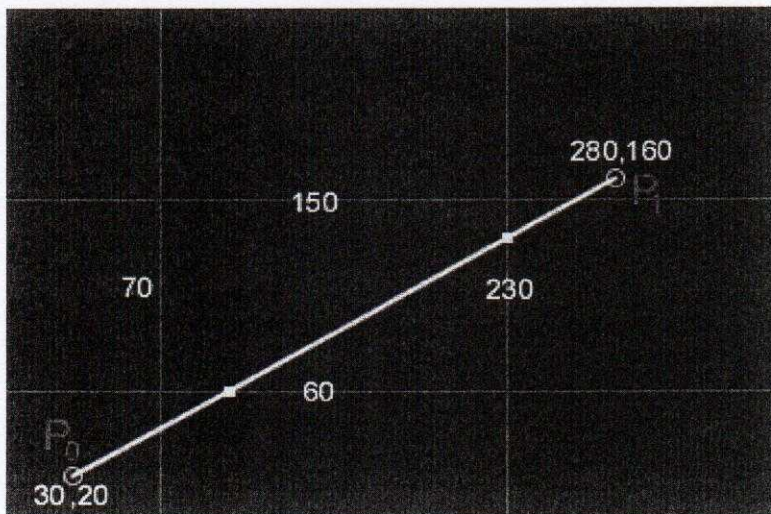
Use Liang Barsky line clipping algorithm for the above figure to clip the line with end points P0 and P1 to the clip window's boundaries and obtain new values of P0 and P1 after clipping.

(10 marks)

6. Write the disadvantage of Sutherland-Hodgeman polygon clipping and explain with suitable example how it was eliminated by Weiler-Atherton Polygon Clipping?

(10 marks)

7. What is perspective projection? Explain all types of perspective projection and obtain the projection matrix for the same.

(10 marks)

8. How are RGB and CMY color models producing different colors on various output devices? Explain their properties.

(10 marks)

9. What is visible surface identification? How visible surface detection algorithms are classified? Explain briefly about one method for each classification.

(10 marks)

10. **Write a short note on the following:**

10A. Illumination models.

10B. Achromatic light.

(10 marks)