



"Investing in Africa's Future"

COLLEGE OF BUSINESS PEACE, LEADERSHIP AND GOVERNANCE

NCSC 300: COMPUTER GRAHICS

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2021

LECTURER: MR A.C MUZENDA

DURATION: 5 HOURS

INSTRUCTIONS

Answer all Questions in Section A and any ONE question from Section B
Total possible mark is 100

Start **each** question on a new page in your answer Booklet.

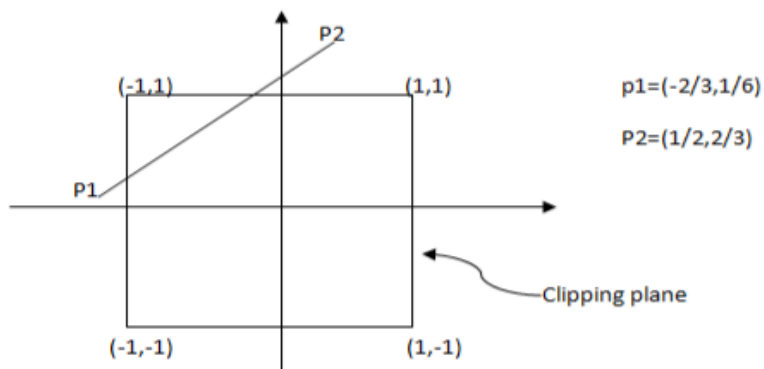
The marks allocated to **each** question are shown at the end of the section.

SECTION A [60 marks]

Answer all questions in this Section

QUESTION ONE

- a. Draw the cross-sectional diagram of a CRT device. Identify the major components and discuss their roles. [8]
- b. Provide the details of clipping the following lines using the Cohen-Sutherland line clipping algorithm. Derive the out codes for each end-point, and determine the segments that will be trivially rejected/accepted. In case where a trivial rejection/acceptance is not possible, indicate where the line be clipped and explain how the resulting clipped segments will be processed. [12]



- c. i. Using Corel draw X7 design a Pepsi can as shown below. [25]



ii. Using Corel draw X7 design AU logo as shown below.

[15]



SECTION B [40 MARKS]

Answer any one questions

QUESTION TWO

- a. A rectangle ABCD with coordinates, A(0;0), B(0;4), C(4;4) and D(4;0) has been transformed. Find the resultant matrix;
 - i. Rotating the rectangle by 45° and translating by (1;0) [10]
 - ii. Draw the resultant diagram for the problem above. [5]

- iii. Explain the steps involved in Bresenham algorithm for line drawing. Demonstrate with an example. Discuss its merits and demerits [8]
- iv. Distinguish between window port & view port? [4]
- v. Explain in detail using an example, the midpoint circle algorithm in computer graphics [8]
- vi. Briefly describe how Liang-Barsky line clipping algorithm is different from CohenSutherland line clipping. [5]

QUESTION THREE

- a. In *computer graphics*, a *computer graphics pipeline*, *rendering pipeline* or simply *graphics pipeline*, is a conceptual model that describes what steps a *graphics* system needs to perform to render a 3D scene to a 2D screen. With the aid of visuals, briefly explain the 3D pipeline and how the 3D viewing is implemented? Explain the importance of the four steps in the 3d viewing pipeline. [14]
- b. Distinguish between convex and concave polygons. [6]
- c. State the main difference between Phong interpolative shading and Gouraud interpolative shading and then describe why Phong interpolative shading is more expensive than Gouraud interpolative shading. [10]
- d. Explain the steps involved in Bresenham algorithm for line drawing. Demonstrate with an example. Discuss its merits and demerits [10]

QUESTION FOUR

- a. Explain Bezier curves and surfaces. [6]
- b. Explain about clipping operations [4]
- c. Describe in detail the shadow-mask method for CRT displays highlighting how different colors can be formed. [10]
- d. Aliasing is a serious problem in that it produces unpleasant or even misleading visual artifacts. Discuss situations in which these artifacts matter, and those in which they do not as well as ways to minimize the effects of jaggies, and explain what the “costs” of those remedies might be. [14]
- e. Explain Back face detection method and Depth buffer method. [6]

THE END