

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
JULY SUPPLEMENTARY EXAMINATIONS 2005

SUBJECT: COMPUTER GRAPHICS
CODE: SCS5204

INSTRUCTION TO CANDIDATES

Answer any four questions.

Time: 3 hours

QUESTION ONE

- a) Explain Brasenham's line generating algorithm can be improved to cater for a line of arbitrary slope [13]
- b) Describe in detail the direct storage method and the colour lookup table method for storing colour information in the frame buffer. Include in your answer the advantages and disadvantages of each of these methods [12]

QUESTION TWO

- a) Modify the Cohen-Sutherland line-clipping algorithm to clip lines against a triangular window. [15]
- b) Explain the step in Lian-Barsky clipping algorithm [5]
- c) Outline how a Direct View Storage Tube operates [5]

QUESTION THREE

Write a program in C++ that renders a circle, which moves across the screen and when it reaches the end of the screen it changes direction, and moves in the opposite direction [25]

QUESTION FOUR

- a) Write a program in C++ that renders a line and count the number of pixels forming the line [11]
- b) Show using matrix algebra that a reflection of the graphics image across the line $y = -x$ is equivalent to the reflection across the y -axis followed by a rotation of -90° [6]
- c) Explain why graphics systems that store graphics information in the display memory are faster than those that do not? [8]

QUESTION FIVE

Outline the following morphing techniques:

- a) Field Morphing technique [13]
- b) Skeleton-based image warping [6]
- c) Mesh warping [6]

END OF QUESTION PAPER