

UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION, MAY 2014

Title of Paper : Computer Graphics

Course Number : CS246

Time Allowed : Three Hours

Instructions : Answer **ALL** questions from Section A
Answer **only THREE** questions from Section B
All questions are worth **20 marks**

Special requirement : Graph paper

This paper should not be opened until permission has been granted by the invigilator.

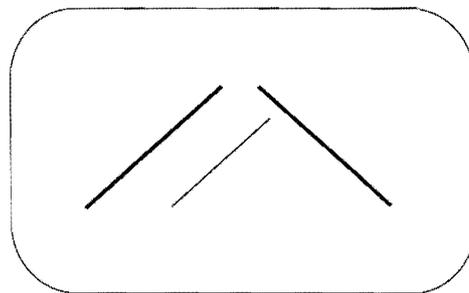
SECTION A

QUESTION 1

- (a) How would you distinguish computer graphics from its closely related counterpart, namely image processing. Give two applications from each discipline. [6]
- (b) As a computer science student, how would you define an API? [3]
- (c) Why should we study UI alongside computer graphics? [5]
- (d) Discuss the criteria for judging a good API. [6]

QUESTION 2

- (a) Compare and contrast raster graphics and vector graphics (paying special attention to how each one flourished or was a failure during its era). [10]
- (b) Draw the input control signals which would produce the following output on a vector graphics display, state your assumptions if any. [10]



The first two lines are parallel; the third intersects the first two at a right angles.

SECTION B

QUESTION 3

- (a) In what way(s) was vector displays superior to printers? [4]
- (b) How much memory is needed for a 640×480 frame buffer with depth 4? [6]
- (c) Compute the point of intersection, using the vector line notations, between the two lines passing through the points: i) $(2,1)$ and $(3,7)$; ii) $(3,3)$ and $(5,12)$ [10]

QUESTION 4

- (a) Compute the viewing transformation matrix for an object window bounded by $(3,0)$ and $(5,4)$ to be viewed on the upper right hand quadrant of the screen. [12]
- (b) Use this matrix in (a) to judge if the images of points $(2,2)$, $(4,2)$ and $(6,2)$ would be inside or outside the viewport. [8]

QUESTION 5

Describe three different interface dialogue systems with their suitable application areas stating all the advantages that each of them has over the other two in the application area that you have chosen, giving an example of an application using that interface in each. [20]

QUESTION 6

- (a) Discuss two groups, with two examples each, of input devices. [8]
- (b) Discuss four problems associated with user interfaces design. [4]
- (c) Discuss any two user interface design principles. [8]