

UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION, MAY 2010

Title of Paper	:	Computer Graphics
Course Number	:	CS 246
Time Allowed	:	Three Hours
Instructions	:	Answer ALL questions of Section A Answer only THREE questions from Section B Each question is worth 20 marks
Special requirement	:	Graph paper

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

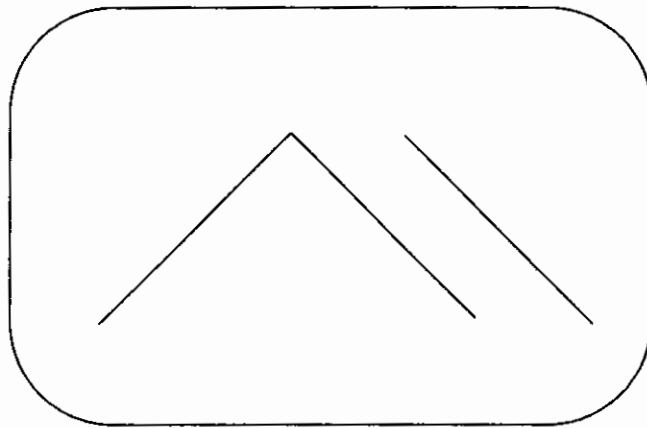
Section A

Question 1.

- a) Why don't we see the colour black yet we do recognize it? **[3]**
- b) Describe how a CRT works. **[8]**
- c) Define an API and state why it should be studied alongside graphics? **[5]**
- d) When would a loud speaker not be advisable to use as an output device, and, for that situation what would be your best substitute? **[4]**

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). **[6]**
- b) Differentiate between menu driven, command driven interfaces. **[4]**
- c) Draw the input control signals which would produce the following output on a vector graphics display. **[10]**



The first two lines intersect at right angles; the third is parallel and same length as the second

Section B

Question 3.

- a) Vector graphics, though later disused, was a great improvement from the era of working with hard copy outputs only – in what way(s) was vector displays superior to printers? **[4]**
- b) Sizes of CRTs are normally given by the length of their diagonal (the ratio of the width and height is standardized at 2:3). With a 14" tube and a 640 x 480 frame buffer, what are the horizontal and vertical resolutions? What area of the screen should be used to get an aspect ratio of 1:1? **[10]**
- c) How much memory is needed for a 1024x512 frame buffer with depth 3? **[6]**

Question 4.

- a) Compute the coordinates of the image of (3,2) after each of the following transformations:
 - rotation around the point (4,1) through an angle of 90°;
 - rotation around the point (3,2) through an angle of 90°. **[5]**
- b) Find the transformation matrix for rotation around the point (x,y) over an angle θ . **[5]**
- c) Draw the diagram resulting from joining the following points: (5,7), (5,4), (2,1) and (2,3) and draw the image that will result after performing the following transformations in succession:
 - scaling by scale factor 2;
 - clipping using the clipping window (0,0) – (10,10);
 - rotation through 90°, around the origin. **[10]**

Question 5.

Describe three different interface dialogues with their suitable application areas stating all the advantages (and possible disadvantages) that each of them has over the other two in the application area that you have chosen. **[20]**

Question 6

- a) Discuss the differences and similarities between a scanner and a data glove. **[8]**
- b) Describe a robust interface. Which was more robust between Windows 95 and Windows 98, and why? **[4]**
- c) Discuss four user interface design principles **[8]**