Uva Wellassa University, Sri Lanka
Faculty of Science & Technology
Computer Science & Technology Degree Program
1st Semester Examination – March 2011
CST 301-2 Computer Graphics

Time: **Two (02)** hours | Total **05** Questions | Answer **all** questions

Question 1. **(20 marks)**

(a) 'Computer Graphics' and 'Image Processing' are two related fields. What is the main difference between these two fields?

(b) Imagine that you have a CMYK printer where the cyan and magenta inks have been swapped. When you attempt to print the following colors, what colors will actually appear on the paper?
Red Green Blue Cyan Magenta Yellow Black White

(c) "The intensity histogram of a digital image gives some useful clues about the shapes of the objects in the image" Do you agree with this statement? Justify your answer.

(d) A graphic created by CorelDrow needs to be viewed by Photoshop. What is the procedure that you are proposing?

(e) You are making a dress but need more fabric. You take a sample of your fabric to the store and find one that looks exactly the same color when held next to your sample. However when you get home you find that somehow the fabric you just bought no longer matches your sample. What is the most likely explanation for what has happened?

Question 2. **(20 marks)**

(a) What is meant by "graphic workstation"? List a modern day PC hardware configuration needed to develop high quality graphics for the print industry.

(b) What are the options available with you to transfer the captured images by a digital camera to a PC? Elaborate the use of each method mentioned here.

(c) What is meant by "Dot trio" in computer monitors? Explain the functionality of the shadow mask.

(d) What is the maximum refresh rate of a monitor with a horizontal scanning frequency of 96 kHz at a resolution of 1280 x 1024?

(e) What is the reason of having a large Video RAM (VRAM) in modern video interface cards? (Explain the reasons with respect to a suitable example)

Question 3. **(20 marks)**

(a) What is "Projection"? Explain in your own terms.

(b) What is the difference between parallel and perspective projections? Describe an application where each type of projection would be preferable.

(c) Is clipping done before or after the perspective division? Justify your answer.

(d) What is rendering pipeline? Briefly explain.

(e) Outline the key ideas behind the radiosity equation for rendering. Radiosity is most useful for what kinds of scenes?

Question 4. **(20 marks)**

(a) What are the three basic transformations in 2D geometric transformation? State the matrix representation of them.

(b) Consider the following two transformations. Do they have the same effect or not? Prove your answer.

I. Rotate the object in the anti clockwise direction by an angle 180^0 around the 'x' axis and then rotate in the anti clockwise direction by an angle 180^0 around the 'y' axis.

II. Rotate the object in the anti clockwise direction by an angle 180^0 around the 'y' axis and then rotate in the anti clockwise direction by an angle 180^0 around the 'x' axis.

(c) Find the matrix representation for Shearing transformation.

(d) Find the transformation matrix for rotation in 3D geometric transformation.

Question 5. **(20 marks)**

Write short notes about the following topics. Use diagrams where appropriate.

(a) OpenGL Architecture.

(b) The Cohen-Sutherland Line Clipping Algorithm.

(c) TARGA image file format.

(d) Deployment of Quadtrees.