

Name: _____

Student Number: _____

Signature: _____

The University Of New South Wales
Sample Exam - Written
Semester 2, 2014

COMP3421 & COMP9415
Computer Graphics

Time allowed: **1 hour**

Total number of questions: **7**

Total number of marks: **30**

Note: Actual final exam will be 2 hours and worth 60 marks

UNSW Approved Calculators **may** be used.

Questions are **NOT** worth equal marks.

Answer **all** questions.

Start each part (A,B,C) in a new booklet

This paper may **not** be retained by the candidate.

Answers must be written in ink.
Except where they are expressly
required, pencils may be used only
for drawing, sketching or graphi-
cal work.

Part A:

Question 1

(5 marks) The normal at a vertex $(0,1,2)$ on a surface is $(0,4,5)$. The light source is $(0,1,4)$. The diffuse colour of the light is $(0.9,0,0.2)$. The diffuse co-efficients of the surface are $(0.4,1,0)$. What will the rgb colour of the vertex be? Assume there is no specular,emmisive or ambient component or light attenuation.

Question 2

(8 marks) Suppose you want a camera positioned at point $(3,2,1)$ in world co-ordinates looking towards point $(1,0,-1)$.

- (a) What other piece of information do you need to give `gluLookAt` in order for it to create a co-ordinate frame for camera space? *(1 mark)*
- (b) Choose some suitable value for that piece of information and show a fragment of OpenGL code that would set the modelview matrix accordingly. *(1 mark)*
- (c) What would the camera's local coordinate frame (in world coordinates) be? *(3 marks)*
- (d) Show what the modelview matrix would contain after the call to `gluLookAt` *(2 marks)*
- (e) Give the camera co-ordinates of a vertex with world co-ordinates of $(-1,1,3)$. *(1 mark)*

Part B: Short answer questions

Start this section in a new booklet

Provide short 3-4 sentence answers to the following.

Question 3

(3 marks) Give 2 uses for BSP trees and explain the differences in how they are used in each situation.

Question 4

(3 marks) What is a fragment shader?

Question 5

(3 marks) What is trilinear filtering?

Part C: Design problems

Start this section in a new booklet

Provide 1-2 paragraph answers to the following.

Question 6

(4 marks) You are applying for a job as a computer graphics expert. In the technical interview they ask you what kind of modelling techniques you would use to model the shape and surface of a shiny metal teapot for a real-time game. Give reasons for your choices.

Question 7

(4 marks) You want to render a scene with soft shadows and realistic diffuse lighting. What technique/s would give the most realistic outcome? What are the pros and cons of this/these techniques?

— End of exam —