COSC342 Exam

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Lecture 24
30 May 2015

The Exam

- ▶ Exam instructions
- ▶ Questions and topics
- ▶ Exam Advice

Exam Instructions

Candidates should answer questions as follows:

Candidates must answer **all** questions.

Questions are worth various marks are shown thus:

(5)

The total number of marks available for this examination is 60.

You should keep your answers short.

In general, if there are two marks for an answer, you should have two things to say.

Exam Instructions

The following material is provided:

Nil.

Use of calculators:

No calculators are permitted.

Candidates are permitted copies of:

Nil.

Exam Topics

- Any material from lectures, tutorials, and laboratories is examinable
  - We have mentioned the types of material that aren't examinable: e.g. programming language specifics that you would just look up as needed.
- Past papers are a useful guide to the style and content of questions
- Some material has been changed for this year
  - More emphasis on OpenGL Render Engine and rasterisation pipeline
  - Some ray-tracing related material reduced
- From last years' exam:
  - We didn't cover Question 11 (Constructive Solid Geometry)
  - Question 10 might make more sense in OpenGL than a ray tracer?
- Older papers have more differences

Exam Advice

- ▶ You have 3 hours, we don't expect you to write for all that time
  - ▶ 60 marks in 3 hours is roughly 1 mark every 3 minutes
- ▶ You should have time to carefully read the question
  - ▶ Look for what is being asked
  - ▶ Look for words like 'show how' or 'explain'
- ▶ Consider how many marks are allocated to the question
  - ▶ We usually expect one piece of information per mark
  - ▶ Don't write an essay for 1 mark or a word for 4

Exam Advice

▶ Consider the following question:

Show how the area of a rectangle with sides of length 7 and 4 can be calculated.

(2)

▶ And these two answers:
  ▶ 28.
  ▶ The area is found by multiplying the lengths of the two sides. So we multiply 7×4 and the answer is 24.

▶ How many marks is each answer worth?

Exam Advice

- Use examples to illustrate ideas
- Use diagrams where appropriate
    - Make sure you label things though!
- It's (more than) OK to write bullet points or notes
    - Better to write key points clearly than a page of text we can't read
- Label your answers clearly with question numbers
    - Indicate if parts of questions are on different pages
- If you need an equation, we'll provide it
    - We'll give it if we think it might help
    - There may be another way to answer the question

Exam Advice – Example from 2016

Consider a scene containing a sphere with radius 1 that is centred at the origin. The ray equation is defined as usual: $\mathbf{p}(t) = \mathbf{u} + t\mathbf{v}$. The quadratic formula set up to solve for t is provided here for your reference.

$$t = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

where:

$$A = \mathbf{v}^2 \qquad B = 2\mathbf{u} \cdot \mathbf{v} \qquad C = \mathbf{u}^2 - 1.0$$

1. Assuming that $\mathbf{u} = \begin{bmatrix} 0 & 0 & -2 \end{bmatrix}^\mathsf{T}$ and $\mathbf{v} = \begin{bmatrix} 0 & 0 & 1 \end{bmatrix}^\mathsf{T}$, what are all the t values for the intersection with the sphere? What is the location of the hitpoint in 3D coordinates?

(3)

2. Now let $\mathbf{u} = \begin{bmatrix} 0 & 0 & 0 \end{bmatrix}^\mathsf{T}$ and $\mathbf{v} = \begin{bmatrix} 0 & 1 & 0 \end{bmatrix}^\mathsf{T}$. What are all the t values for the intersection with the sphere now? Explain the geometric meaning of each t value that you find.

(3)