UG Exam Performance Feedback
Third Year
2019/2020 Semester 1

COMP37111 Advanced Computer Graphics — Toby Howard, Steve Pettifer

Comments

1. A straightforward starter question. Most of the class were able to recognise that this was about “following rules”, and so got full marks.
A few people focussed on the visual effects of particular types of generative modelling, which was not what was being asked.

2. Well-answered, with sensible suggestions (there was no single correct
answer) for both the modelling part and the rendering part. Some people, however, didn't answer the rendering part at all, which seems odd. For both parts I gave credit for anything which was plausible, quite a wide field because the question was quite an open one.

3. This question was about recursive division and displacement modelling and was quite well-answered. Most of the class recognised that the process was inherently recursive, but a few people did not.

4. This question asked about a workflow (a set of interrelated ordered logical steps to achieve a goal), and it about half the class did not describe a workflow at all; rather, they wrote down everything they knew about 3D scanning and also Delaunay Triangulation. I gave credit where due, but to get full marks a plausible workflow had to be described.

5. The first part was well-answered by most of the class, but the second part was often answered vaguely, without spelling out that video is essentially a set of still photos usually from slightly different viewpoints. This is the crucial point.

6. This final question required some thought, although the basic idea had been discussed in the lectures. Those who specifically said the CG camera should have the same parameters as those estimated for the real camera which recorded the scene, got full marks. Many people were not clear about this. About half the class, oddly, did not address the rendering aspect at all (as in Q2).

7. This was a fairly easy 'starter' question, and almost everyone gave a decent explanation and got full marks.

8. What I was expecting here was a description of the secondary reflection and refraction rays and the associated colour/energy change, which most people described well for full or nearly-full marks. What I hadn't realised was that the question could also be interpreted as asking about the geometry calculations, but I accept that's (just about!) a reasonable interpretation too and awarded marks without penalty to the few people that had gone down that path.

9. This was generally well answered, though with rather liberal and incorrect use of 'an infinite number of rays'. I was looking for a clear statement about two things 1) the way in which scattering of light in all directions would happen at the soft surface, resulting in very many (but not infinite) secondary rays, and 2) that the recursive nature of the algorithm would mean this was an exponential cost. Many people stated both of these things clearly; some people muddled one or both aspects and lost fractional marks.

10. Also answered well for the most part; I'd set the scene up so that radiosity was the obvious choice and was the most straightforward to justify. There were, however, a handful of people who made a compelling argument for a combination of Ray Tracing, local illumination and culling techniques, and while I'm still not totally convinced it's a sensible approach they were creative, well thought out so weren't penalised.

11. The most plausible answer to this question would be based on a pre-compute/baked-texture approach, which many people came up with (some even spotted you can partition the house based on a portal-style approach to reduce the combinatorial complexity of lots of lights, bravo if you did). A few people made valiant attempts at optimising/tweaking the full radisoity solver into realtime, with varying degrees of plausibility.

12. This wasn't answered as well as I was expecting, often with names mangled or descriptions unclear. The 'obvious' answer really is probably HBV, which a fair number of people chose and explained well. A lot of people went for BSP, which is also sensible (but this was often poorly explained). More people than I expected chose octree, which isn't really that sensible (but of these many justified it fairly well considering, so still got reasonable marks).

13. The obvious answer here was to use portal culling (though for full marks I needed a decent description of what this meant, including the recursive aspect). Some people invented solutions relating to separate BSP trees or Octrees per room, which was also acceptable if described meaningfully.

14. I marked these last two fairly strictly; they are after all intended to be the hardest bit. Plenty of people went for the solution I had in mind, which was to fudge the effect with a local illumination model; some proposed a limited form of local ray tracing which was also fine (though I didn't award full marks for simply saying 'combine ray tracing and

radiosity' -- it needed to be considerably more considered than that). Excessive use of the word 'shinny'. For full marks I needed comments on both the effect of the torch, and the implication of the introduction of the shiny objects, some people commented on only one or the other.

15. This final question required further creativity, and I looked for precise rather than wooly answers for full marks. The trick here was to recognise that none of the spatial enumeration techniques from earlier work well for the flying bugs because the constant movement would impley constant re-calculation (even localised) of the structure, and that would almost certainly outweigh any any benefit. I was looking for some indication of this, and some plausible discussion about how it might be solved for full marks. There were plenty of decent attempts here which was good to see.