COMPUTER SCIENCE TRIPOS Part IA 75%, Part IB 50% − 2018 − Paper 3

3 Introduction to Graphics (PR)

Consider the problem of rendering a scene consisting of spheres graphically using ray tracing.

(a) Give a brief overall description of the mathematics underlying the algorithm. Discuss modelling the geometry of individual spheres, formulating the vector equation of a ray, modelling different lighting effects on the surfaces of the spheres, and considering spheres made of refractive and mirrored material.

[10 marks]

(b) What is meant by *spatial aliasing* and *temporal aliasing* in an image?

[3 marks]

(c) Describe how super-sampling can be used to reduce spatial aliasing.   [4 marks]

(d) What is meant by *distributed ray tracing* and when is it used?   [3 marks]