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]