2011 Paper 8 Question 1

Advanced Graphics

(*a*) Define the following terms:

    (*i*)   the *Voronoi diagram* of a set of points P_i;   [1 mark]

    (*ii*) the *Delaunay triangulation* of a set of points P_i;   [1 mark]

    (*iii*) the *equiangularity* of a triangulation of a set of points P_i;   [1 mark]

    (*iv*) the *empty circle* property of a Voronoi diagram.   [1 mark]

(*b*) Photon mapping is a two-phase algorithm consisting of *photon scattering* followed by *rendering*.

    (*i*)   Describe photon mapping's *scattering* phase.   [4 marks]

    (*ii*) Describe photon mapping's *rendering* phase.   [4 marks]

    (*iii*) Explain why photon mapping is considered to be a *Monte Carlo* algorithm.   [2 marks]

(*c*) Compare and contrast *vertex* and *fragment* shaders. Explain where each fits in the modern graphics pipeline.   [6 marks]