COMPUTER SCIENCE TRIPOS Part II – 2012 – Paper 7

1 Advanced Graphics (NAD)

(*a*) *NURBS* and *subdivision* are alternative methods for representing surfaces in three dimensions.

(*i*) Compare and contrast *NURBS* and *subdivision* for representing surfaces in three dimensions. [5 marks]

(*ii*) Suggest why the animation industry favours subdivision and the CAD industry favours NURBS. [2 marks]

(*b*) Chaikin's corner-cutting curve subdivision method is based on the quadratic uniform B-spline.

(*i*) Describe Chaikin's method. [3 marks]

(*ii*) Describe the quadratic uniform B-spline for representing curves. [4 marks]

(*iii*) Describe how Chaikin's method for curves is extended and generalised to produce a subdivision method for surfaces that is able to cope with polygons with any number of sides and to cope with vertices with any number of incident edges. [6 marks]