

2002 Paper 8 Question 4

Advanced Graphics

- (a) Describe how an object built using constructive solid geometry (CSG) can be represented using a binary tree. Given the intersection points of a ray with each primitive in the tree, show how to calculate the first intersection point of the ray with the entire CSG object. [6 marks]
- (b) Implicit surfaces are normally combined by adding the field functions together to create a “blobby” blended surface. Describe an alternative mechanism (or mechanisms) for combining implicit surfaces which would produce results more akin to CSG union and intersection. Explain why it produces these results. Given this mechanism, suggest a way of combining implicit surfaces to produce a result similar to CSG difference. [4 marks]
- (c) Describe the basic radiosity algorithm. [10 marks]