

CSE 275, HW3, 10/11/04

Due, Tues, 10/19/04

Word & Graphics Processed Hardcopy handed in class

Consider four points, which form consecutively connected line segments, each of which is parallel to one of the co-ordinate axes. These four line segments and the interior contained by them is called a bounding box.

1. Consider the bounding box B_1 , which is defined by integer co-ordinates

$$\max X_1, \max Y_1, \min X_1, \min Y_1$$

and the bounding box B_2 which is defined by integer co-ordinates

$$\max X_2, \max Y_2, \min X_2, \min Y_2.$$

Write out the most efficient full list of comparisons that must be considered to answer whether B_1 and B_2 are disjoint. (2pts)

2. To answer the question of whether B_1 and B_2 are disjoint, would the corresponding code need to execute all of the conditions you have indicated in your previous answer? Explain your answer, where a well-drawn picture could be effective. (2 pts)

3. Consider a polyline P_1 which forms the border of one polygon and another polyline P_2 which forms the border of another polygon. If $B_1 \cap B_2 \neq \emptyset$, must $P_1 \cap P_2 \neq \emptyset$? (1 pt)

4. Suppose the co-ordinates given in Question #1 were floating point values. Would any modifications be necessary to the conditions previously presented in answer to Question #1? Explain your answer, giving any additional conditions if you respond positively. (2 pts)

5. Suppose that you were given two concave polygons G_1 and G_2 each defined by four points, as p_1, p_2, p_3, p_4 and q_1, q_2, q_3, q_4 , where it is understood that G_1 and G_2 consist of both their perimeters and their interiors. Design an algorithm that will resolve whether these two concave polygons intersect. (3 pts)