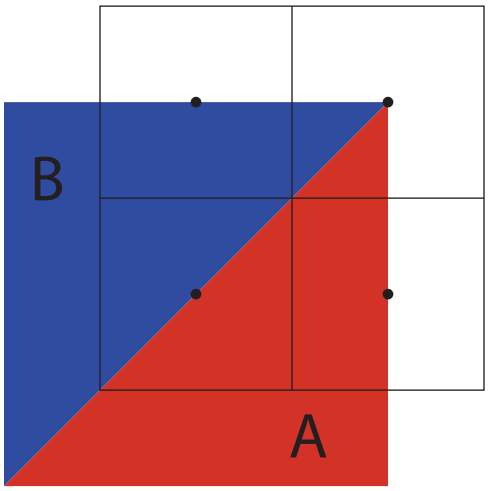
CS 465 Homework 9

out: Friday 10 November 2006
due: Friday 17 November 2006



For the following problems consider the above picture: we have two triangles A and B, with screen space coordinates $A_1 = (1, 1)$, $A_2 = (-1, -1)$, $A_3 = (1, -1)$ and $B_1 = (-1, -1)$, $B_2 = (1, 1)$, $B_3 = (-1, 1)$. Our image size is 2×2 pixels, following the normal conventions of $(0, 0)$ being the bottom leftmost pixel and integral centers for pixels. The triangle A has color $(210, 50, 30)$, the triangle B has color $(10, 60, 190)$, and the background of the image is $(255, 255, 255)$. We assume in all questions below that we are performing alpha-compositing on the resultant scene using the **over** operator and box filtering.

1. What is the color of pixel $(1, 0)$ using compositing? What is its true value (i.e. the value you would get using ideal antialiasing directly on the complete scene)?

2. What is the color of pixel $(1, 1)$ using compositing (compositing A first and then B)? What is its true value (using the same definition as above)?

3. Suppose we make n copies of triangle A and composite the resultant image. What is the color of pixel $(1, 0)$ as $n \to \infty$?

4. Suppose we make n copies of triangle A and n copies of triangle B and composite the image by first compositing all the copies of A and then all the copies of B. What is the color of pixel $(1, 1)$ as $n \to \infty$?

5. Again, suppose we make n copies of triangles A and B, except this time we alternate between compositing an A copy and a B copy. What happens to the color of pixel $(1, 1)$ as $n \to \infty$? Be as specific as possible.