Suppose we have an triangle that is inside the square. Now we will maximaze area of this triangle using this algorithm. For each vertex of the triangle we will move it as far from the opposite edge as possible so the altitude to the edge increases to its maximum. Because the farthest point to a certain edge is always in the farthest corner of the square, the triangle with greatest area has all its vertices in three different cornerns of the square. Hence, the triangle's area is half of the square's.