You are given an $m \times n$ pixelated image, where each pixel is 1mm $\times$ 1mm. Some pixels are black and others are white. White pixels should be considered as empty. If two black pixels are adjacent (where each pixel p has four adjacent pixels, i.e. above, below, to the right, and to the left, then we say those two pixels are part of the same **object**. Being part of the same object is transitive: if black pixels a and b are part of the same object and b and c are, then a and c are as well.

Describe an algorithm which, given the description of a pixelated image stating which pixels are black and white (you could imagine the input is an array `A[1..m][1..n]` where `A[i][j]` is the color of pixel (i, j)), outputs the number of objects, *and* for each object the area of the smallest axis-aligned rectangle that encloses it.

pixelated image containing four objects, whose bounding boxes (drawn in red) have areas 6, 4, 15, and 1.