Q2. Algorithm: Find the largest square border.   
  
Ans:   
Let’s assume that the black boxes are represented as 1 and white boxes are represented as 0.  
so if we have the following example:

grid = [[0,0,0,1,1,1],

[0,1,1,1,1,0],

[0,1,0,0,1,0],

[0,1,1,0,1,0],

[0,1,1,1,1,0],

[1,1,0,0,0,1]]

In the above example the largest square is 4X4 pixels.

Now, to solve this we can do the following:

1. Create two prefix count matrices, one for horizontal and one for vertical.  
   i.e. horizontal matrix should have all the contiguous occurrences of 1 before an index horizontally and vertical matrix should have all the contiguous occurrences of 1 before an index vertically.  
   for the above example, our prefix matrices will be -   
     
   horizontal = [[0,0,0,1,2,3],  
    [0,1,2,3,4,0],  
    [0,1,0,0,1,0],  
    [0,1,2,0,1,0],  
    [0,1,2,3,4,0],  
    [1,2,0,0,0,1]]  
     
   vertical = [[0,0,0,1,1,1],  
    [0,1,1,2,2,0],  
    [0,2,0,0,3,0],  
    [0,3,1,0,4,0],  
    [0,4,2,1,5,0],  
    [1,5,0,0,0,1]]
2. Now that we have prefix matrices ready, we can start traversing the grid from bottom right corner. We will traverse in the reverse order row-wise (last row, then second last row and so on..).
3. Every time we come across a 0 we skip and move ahead, but if we come across a 1 then we will check the value of that (i,j) in the horizontal prefix matrix and vertical prefix matrix.
4. If the value at horizontal[i][j] = x and vertical[i][j] is = y, then we will check the value at horizontal[i][j-min(x,y)-1] and vertical[i-min(x,y)-1][j]. If the values at all these are greater than equal to min(x,y).

Pseudo Code:  
(assuming NXN grid)

for i in range(n-1,-1,-1):

for j in range(n-1,-1,-1):

if grid[i][j] == 0:

continue

length = min(horizontal[i][j],vertical[i][j])

if vertical[i- length-1][j] >= length and horizontal[i][j- length-1] >= length:

ans = max(ans,length)

Q3: Mirrors Database.

We will have the following the following entities:

1. mirror\_product
2. sales\_representative
3. customer
4. order
5. sale
6. sale\_status

