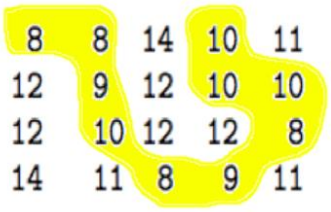
EECS101: HOMEWORK #3 SOLUTION

Written Problem

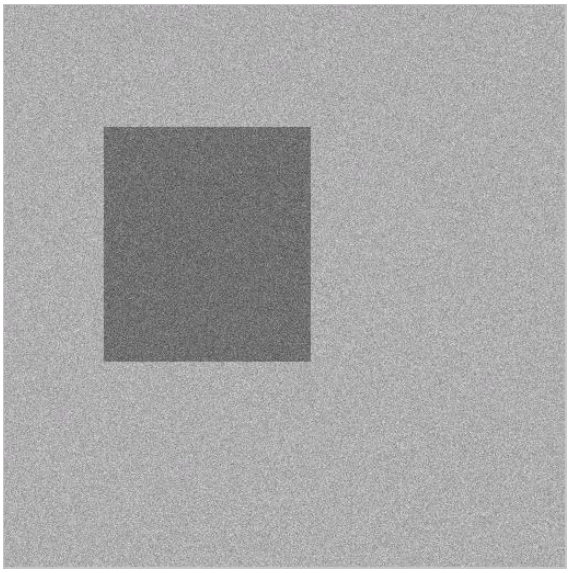


N	I_j	μ	σ^2	T/F
1	8	8	0	T
2	8,8	8	0	T
3	8,8,9	8.33	0.22	T
4	8,8,9,10	8.75	0.6875	T
5	8,8,9,10,8	8.6	0.64	T
6	8,8,9,10,8,9	8,667	0.56	T
7	8,8,9,10,8,9,8	8.57	0.53	T
8	8,8,9,10,8,9,8,10	8.75	0.688	T
9	8,8,9,10,8,9,8,10,10	8.89	0.765	T
10	8,8,9,10,8,9,8,10,10,10	9	0.8	T
11	8,8,9,10,8,9,8,10,10,10,11	9.18	1.057	F

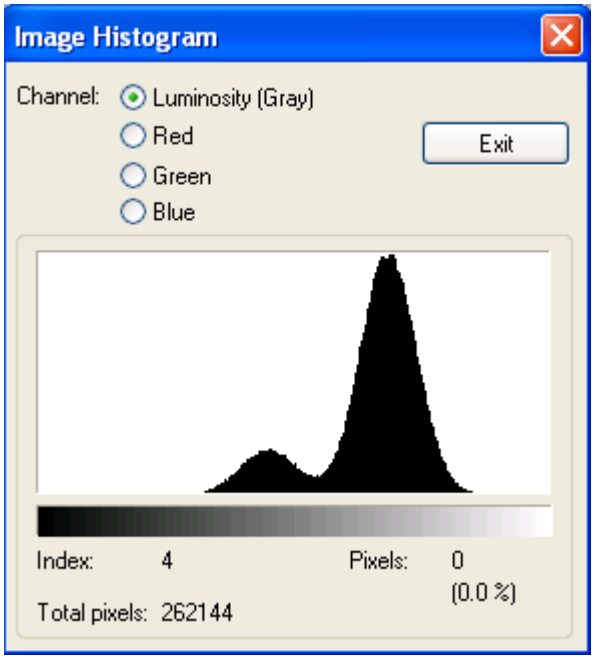
The effective area will be the first 10 values.

Computer Problem

1. image1
   a) Display



   b) Histogram



c) Threshold = 139

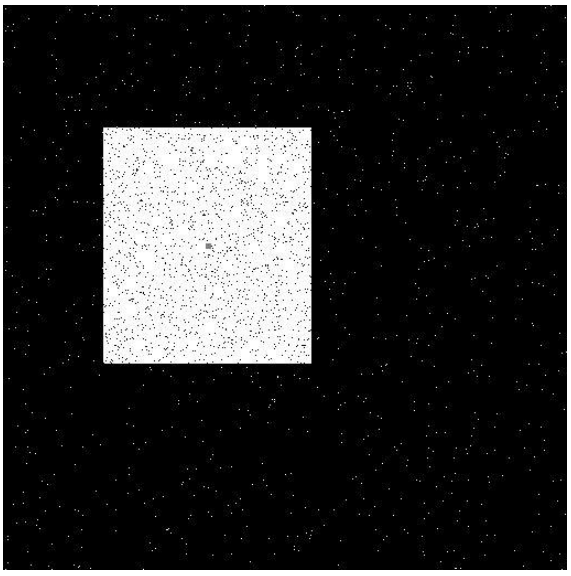
d) $A = \sum_i \sum_j b_{i,j} = 39605$

$$\bar{x} = \frac{\sum_i \sum_j j b_{i,j}}{\sum_i \sum_j b_{i,j}} = 186$$

$$\bar{y} = \frac{\sum_i \sum_j i b_{i,j}}{\sum_i \sum_j b_{i,j}} = 218$$ （origin: upper left corner of the image）

Object center (origin: bottom left corner of the image): (x0, y0) = (186, 294)

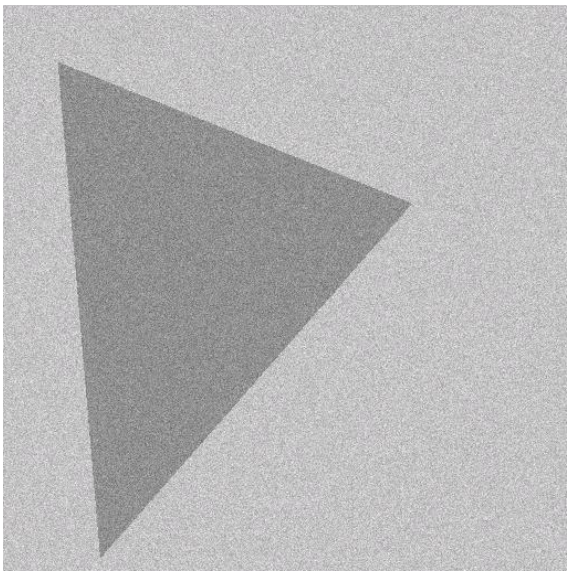
e) Binary image



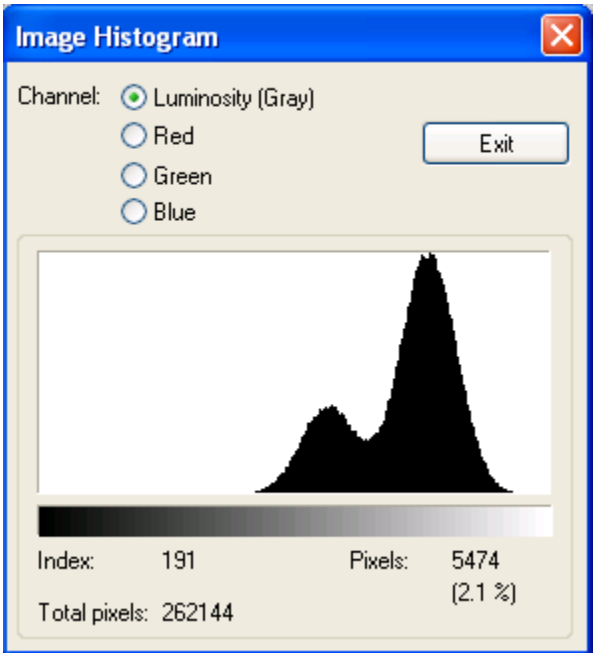
The gray point indicates the center.

2. image2

a) Display



b) Histogram



c) Threshold = 164

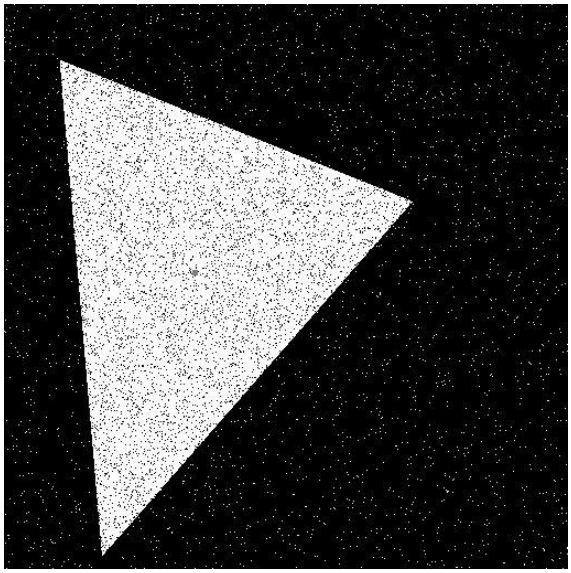
d) $A = 65843$

$\bar{x} = 173$

$\bar{y} = 243$ （origin: upper left corner of the image）

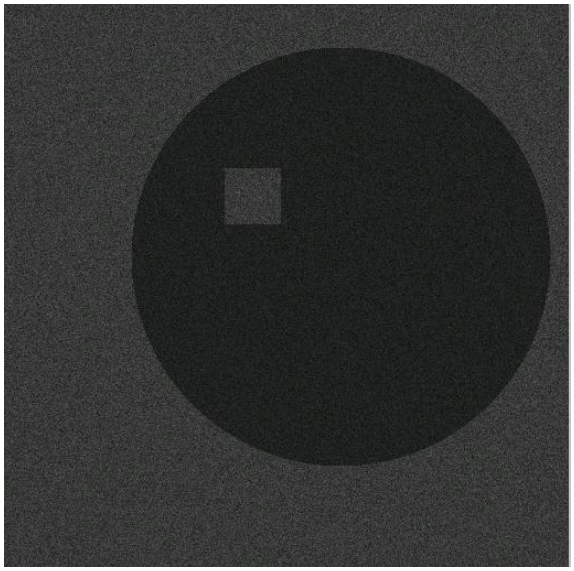
Object center (origin: bottom left corner of the image): (x0, y0) = (173, 269)

e) Binary image

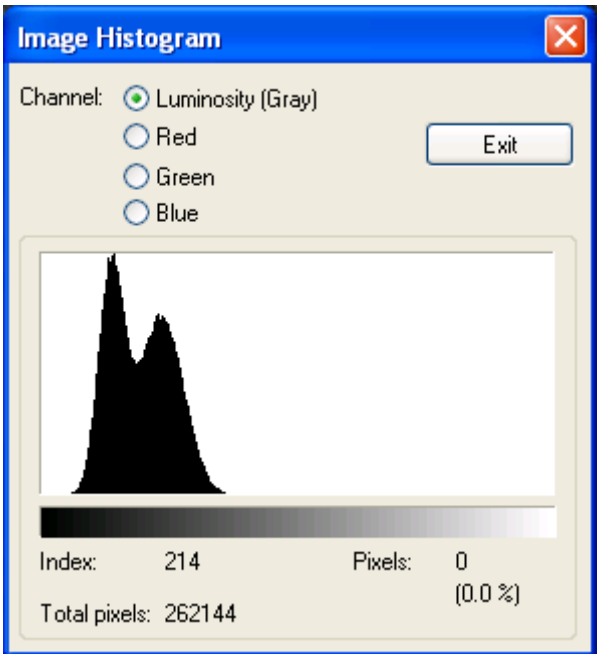


The gray point indicates the center.

3. image3
   a) Display



   b) Histogram



c) Threshold = 48

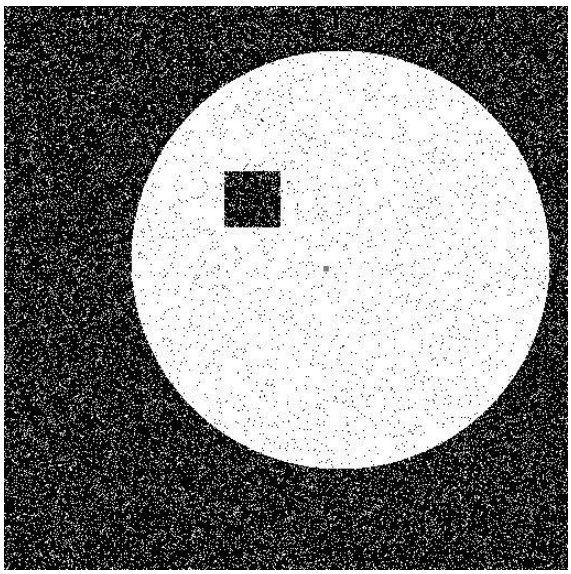
d) $A = 129498$

$\bar{x} = 292$

$\bar{y} = 238$ （origin: upper left corner of the image）

Object center (origin: bottom left corner of the image): (x0, y0) = (292, 274)

e) Binary image



The gray point indicates the center.