

HW #3

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HW #3

$N(K) = \text{TRUE}$, if $\sigma_i^2 \leq 1$
 $N(K) = \text{FALSE}$, if $\sigma_i^2 > 1$

$$\sigma_i^2 = \frac{1}{N} \sum_j (x_j - \mu)^2$$

First region:

8	8
12	9

 14 10 11
12 10 12 12 8
14 11 8 9 11

$$\mu = \frac{83}{9}$$

$$\mu = \frac{8+8+14+12+9+12+12+14+11}{9} = 9.25$$

$$\sigma^2 = (9-9.25)^2 = 0.0625$$

μ : move to 9

$$\mu = \frac{8+8+14+12+9+12+12+14+11}{9} = 10.8$$

$$\sigma^2 = (10-10.8)^2 = 0.64$$

μ : move to 10

$$\mu = \frac{12+9+12+12+10+12+14+11+8}{9} = 11.11$$

$$\sigma^2 = (11-11.11)^2 = 0.0123$$

$$\sigma^2 = (12-11.11)^2 = 0.7921$$

Current Region:

8	8	14	10	11
12	9	12	10	10
12	10	12	12	8
14	11	8	9	11

μ : move to 12 on the right

$$\mu = \frac{9+12+10+10+12+12+11+8+9}{9} = 10.33$$

$$\sigma^2 = (10-10.33)^2 = 0.1089$$

μ : move to 10 on the right

$$\mu = \frac{14+10+11+12+10+10+12+12+8}{9} = 11$$

$$\sigma^2 = (10-11)^2 = 1, \sigma^2 = (12-11)^2 = 1$$

μ : move to 12 under 10

$$\mu = \frac{12+10+10+12+12+8+8+9+11}{9} = 10.22$$

$$\sigma^2 = (11-10.22)^2 = 0.6084$$

μ : move to 11

$$\mu = \frac{12+8+9+11}{4} = 10$$

$$\sigma^2 = (7-10)^2 = 9$$

μ : back to 10 above 10 on 15

$$\mu = \frac{10+14+11+12+10+10}{6} = 11.2$$

$$\sigma^2 = (11-11.2)^2 = 0.04$$

μ : move to 11

$$\mu = \frac{10+11+10+10}{4} = 10.25$$

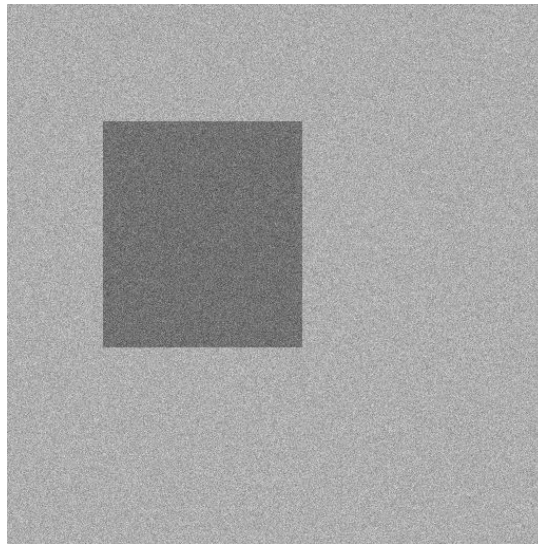
$$\sigma^2 = (10-10.25)^2 = \frac{1}{16}$$

Final region:

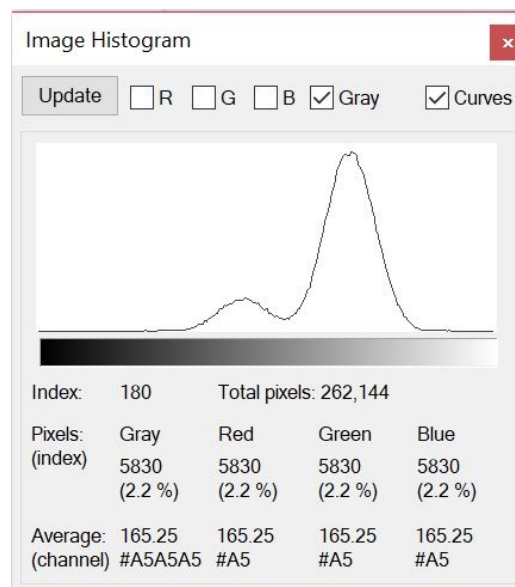
8	8	14	10	11
12	9	12	10	16
12	10	12	12	8
14	11	8	9	11

Image 1:

1.



2.



3. Threshold is 138 for separating object from the background.

4. **$A = 39605$, $x_center = 186$, $y_center = 218$**

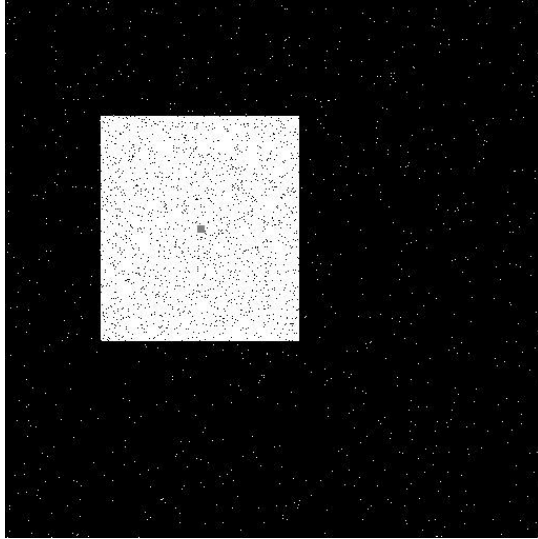
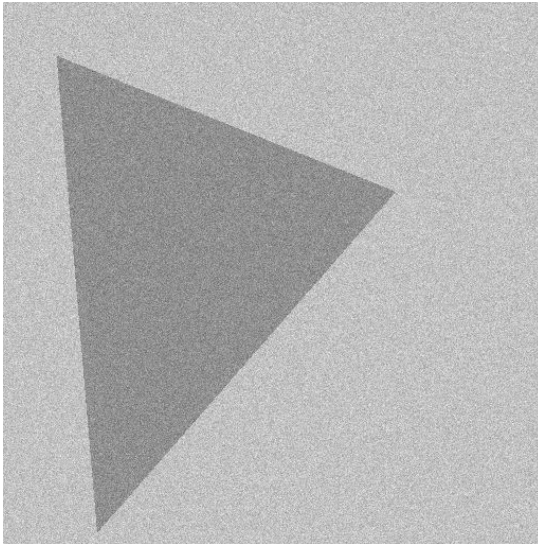
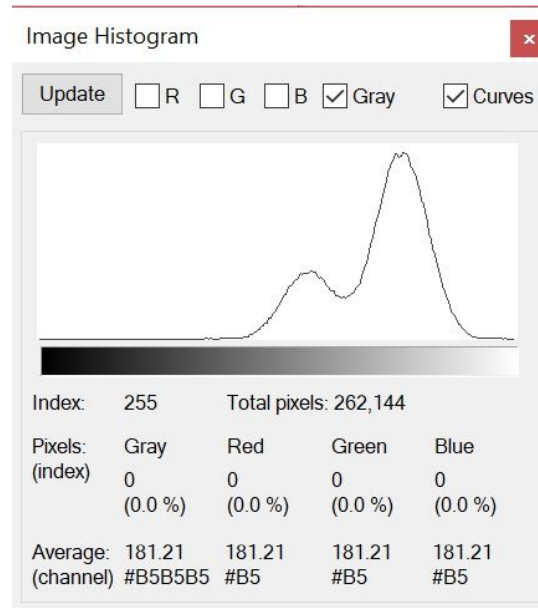


Image 2:

1.



2.



3. Threshold is 163 for separating object from the background.

4. **A = 65843**, **x_center = 173**, **y_center = 243**

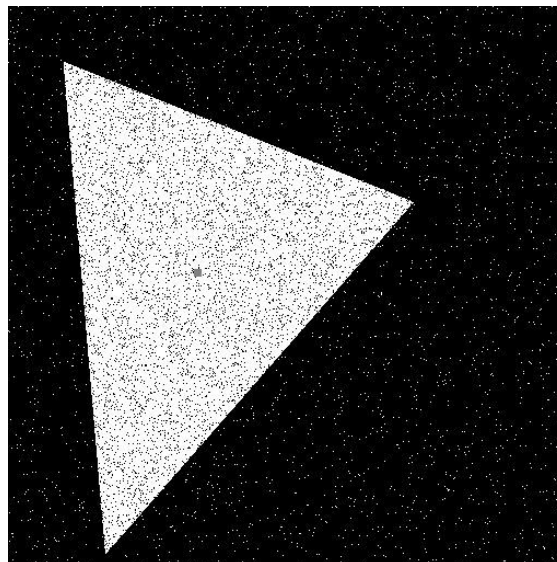
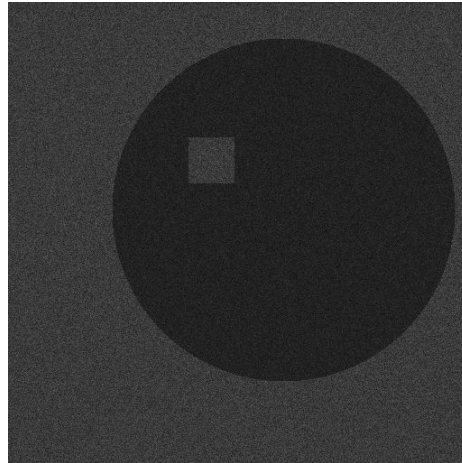
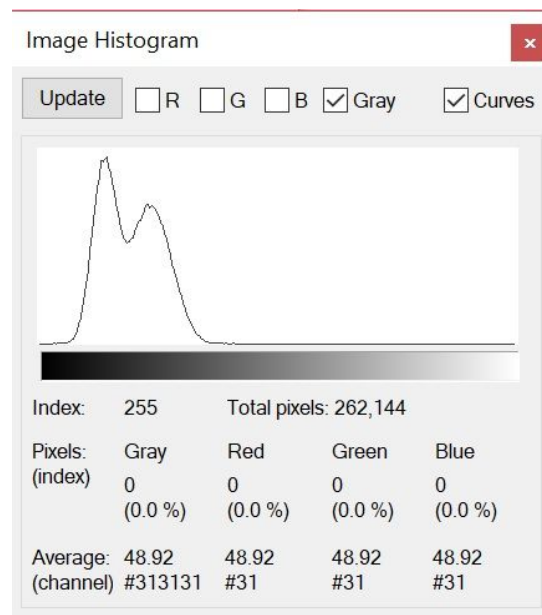


Image 3:

3.



2.



3. Threshold is 46 for separating object from the background.

4. **$A = 125550$, $x_center = 294$, $y_center = 236$**

