

# Image Enhancement Using Histogram

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# Histogram (PDF)

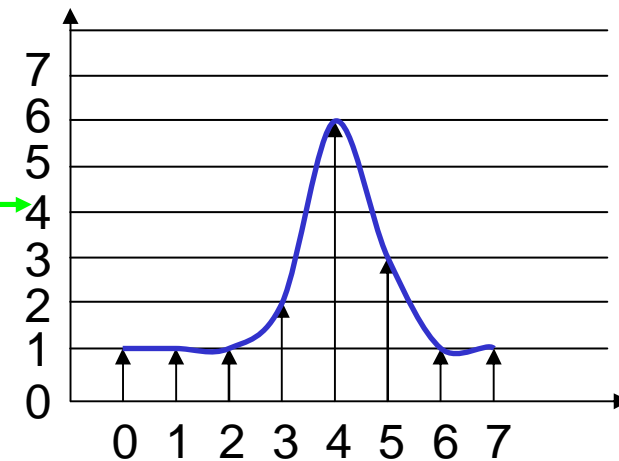
- What is the histogram of an image
  - Probability density function of pixel values

Dynamic range is 0~7

4	4	4	4
5	4	6	7
5	3	3	0
1	2	4	5

Histogram

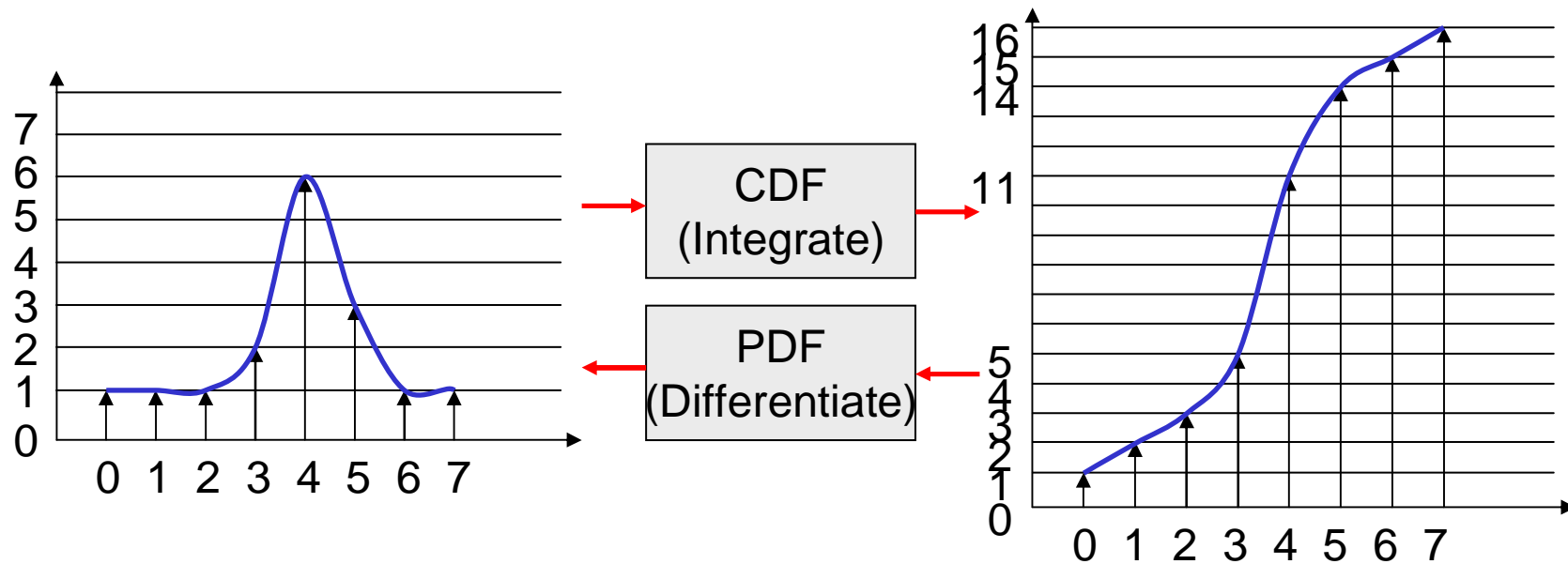
Counted Number



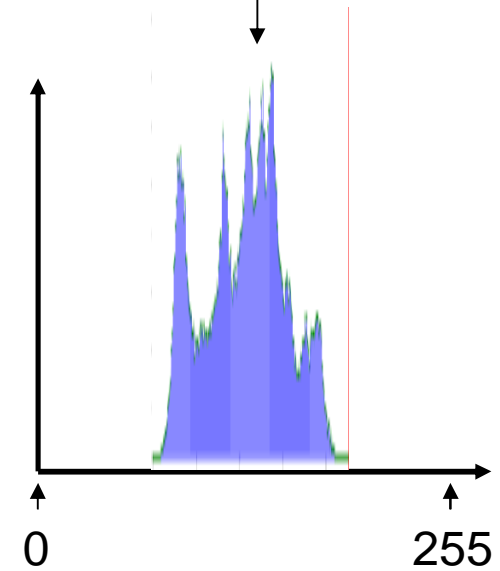
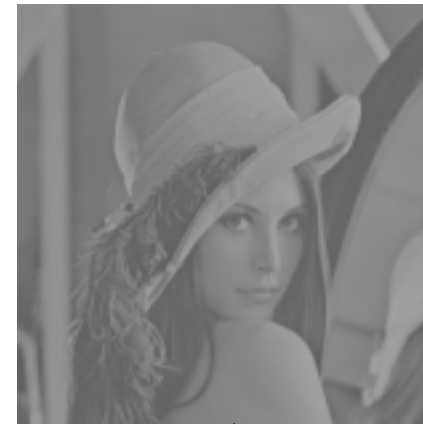
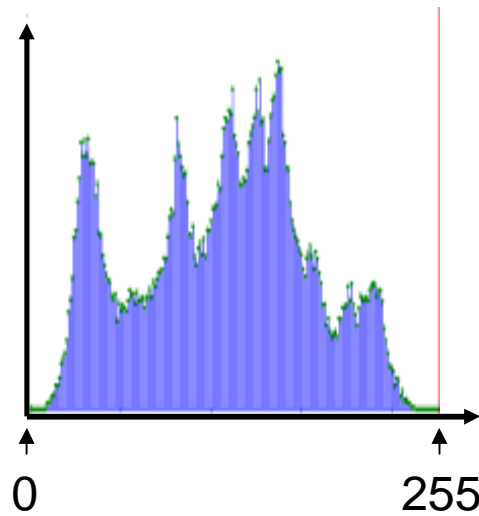
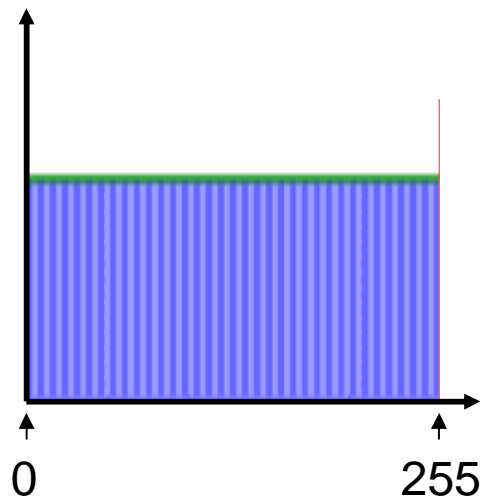
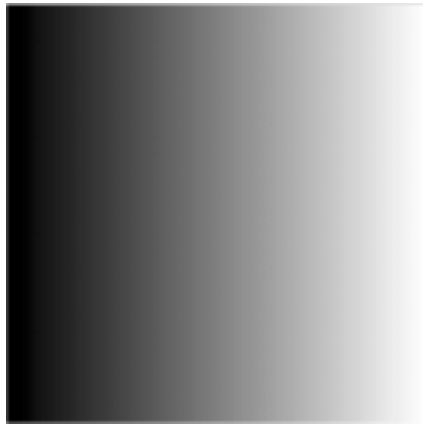
The pixel value "3" is counted two times

# Histogram (CDF)

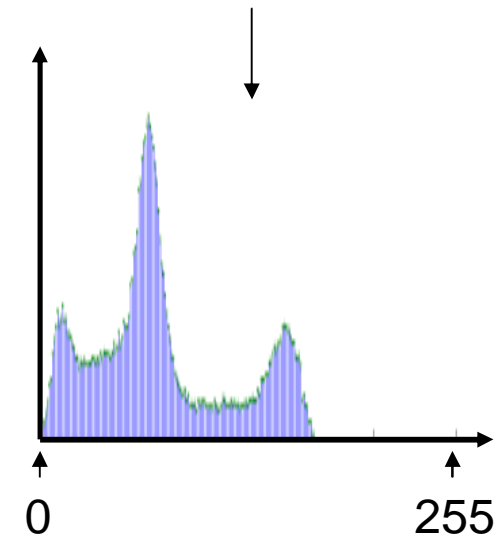
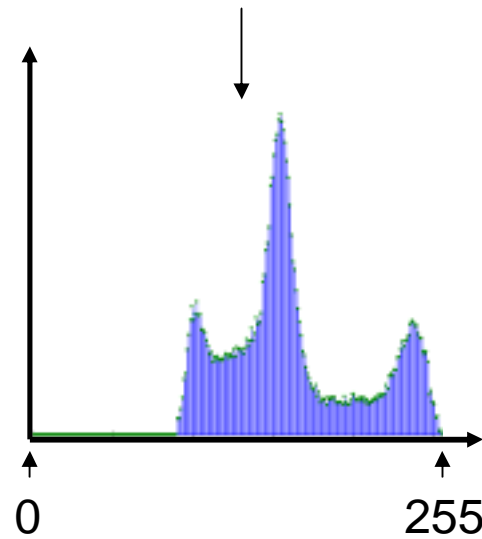
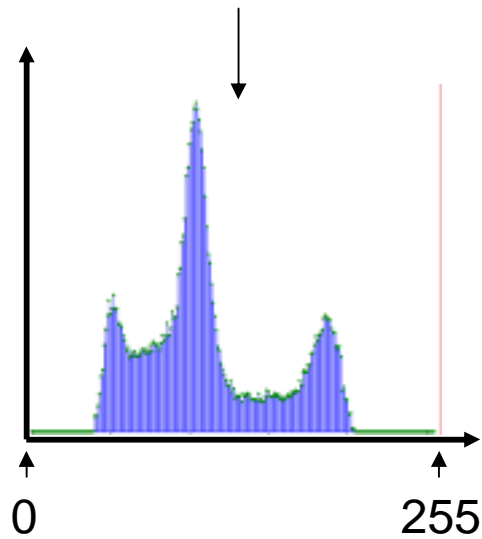
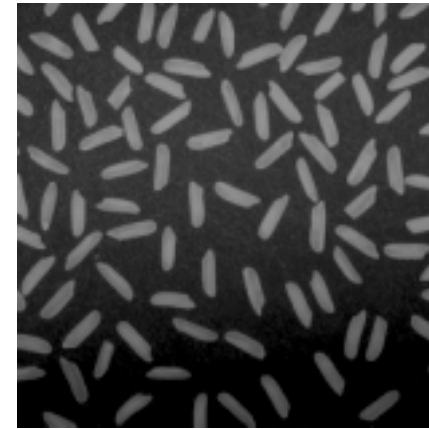
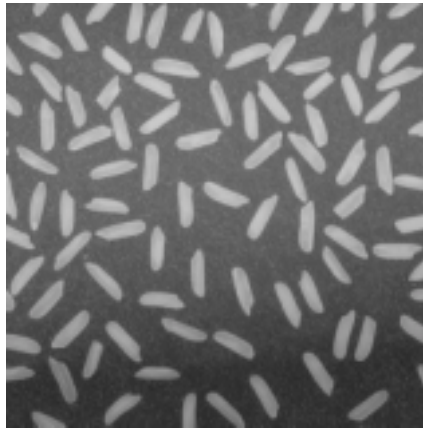
- Probability Density Function (PDF)
- Cumulative Density Function (CDF)



# Examples of Image Histogram

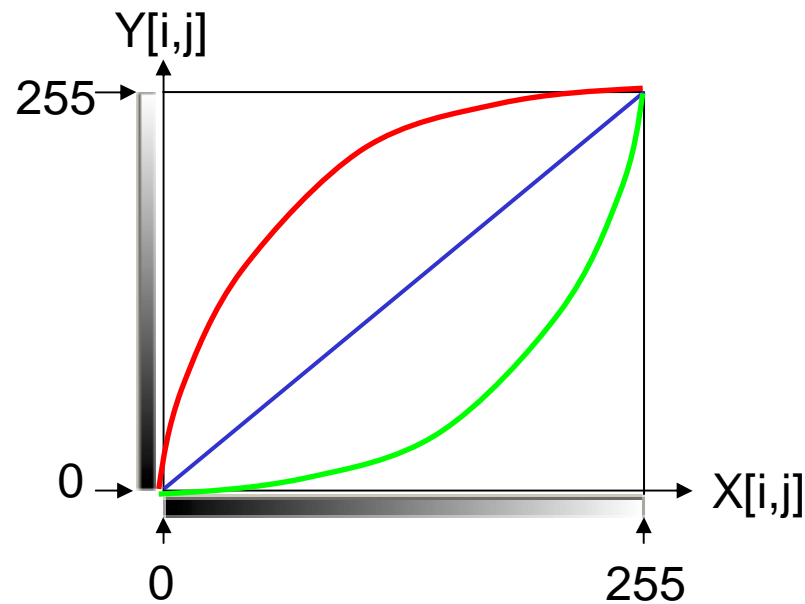
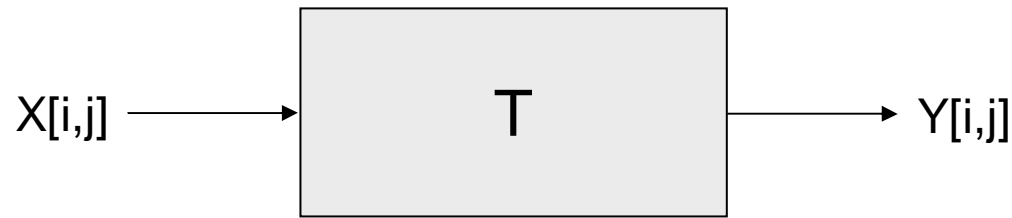


# Examples of Image Histogram



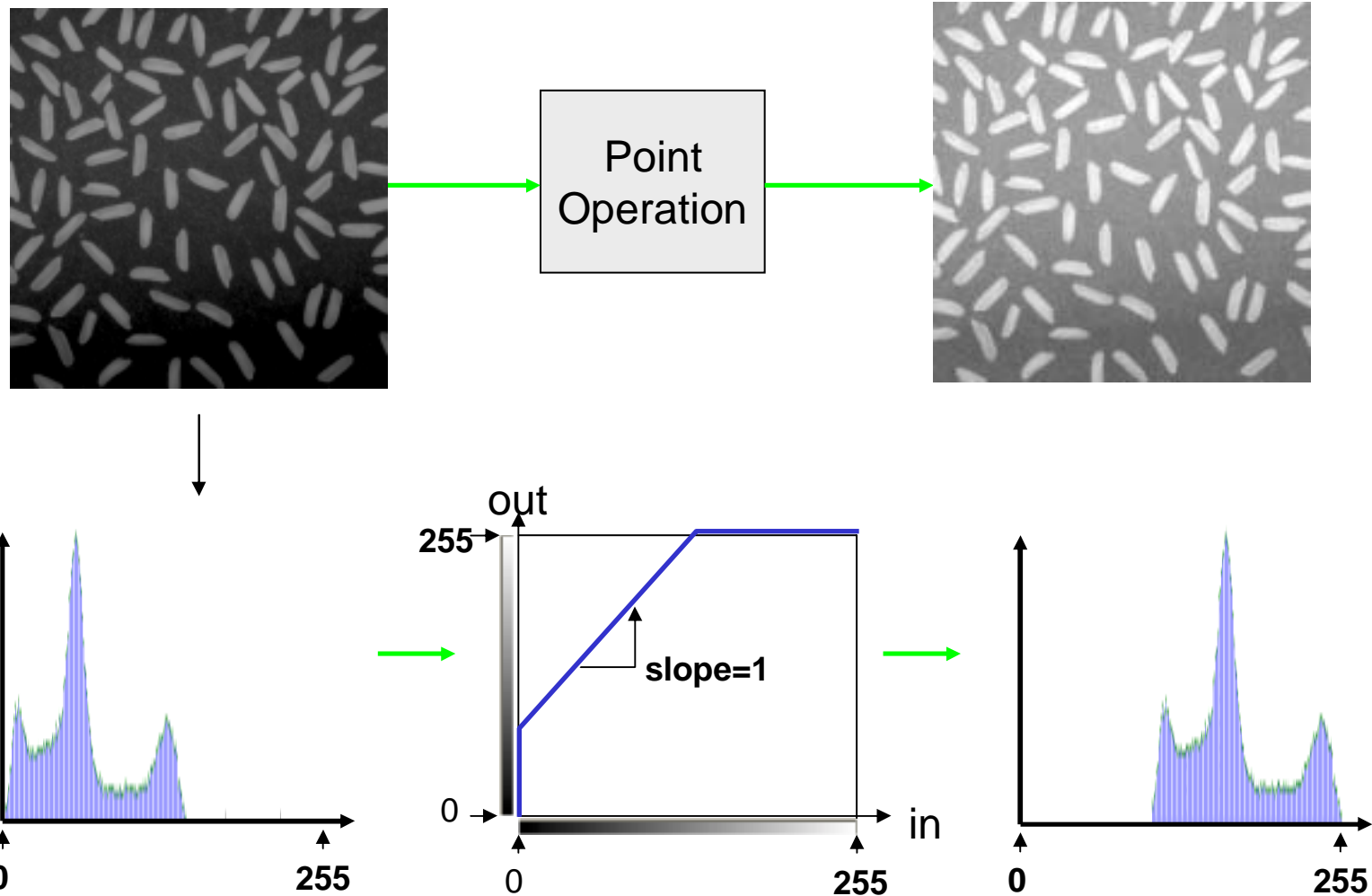
# Histogram and Point Operation

- Point operations change the histogram



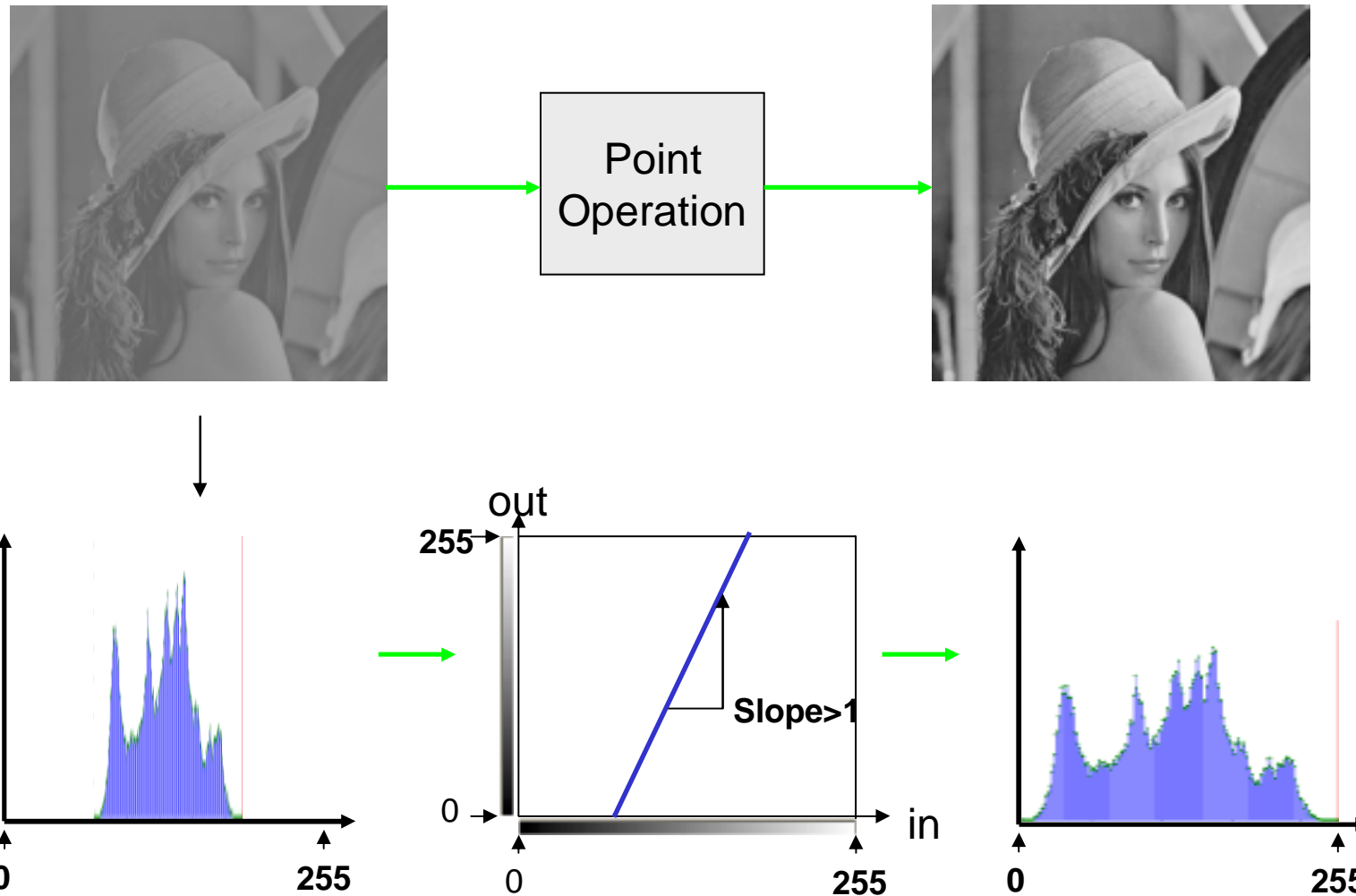
# Histogram and Point Operation

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# Histogram and Point Operation

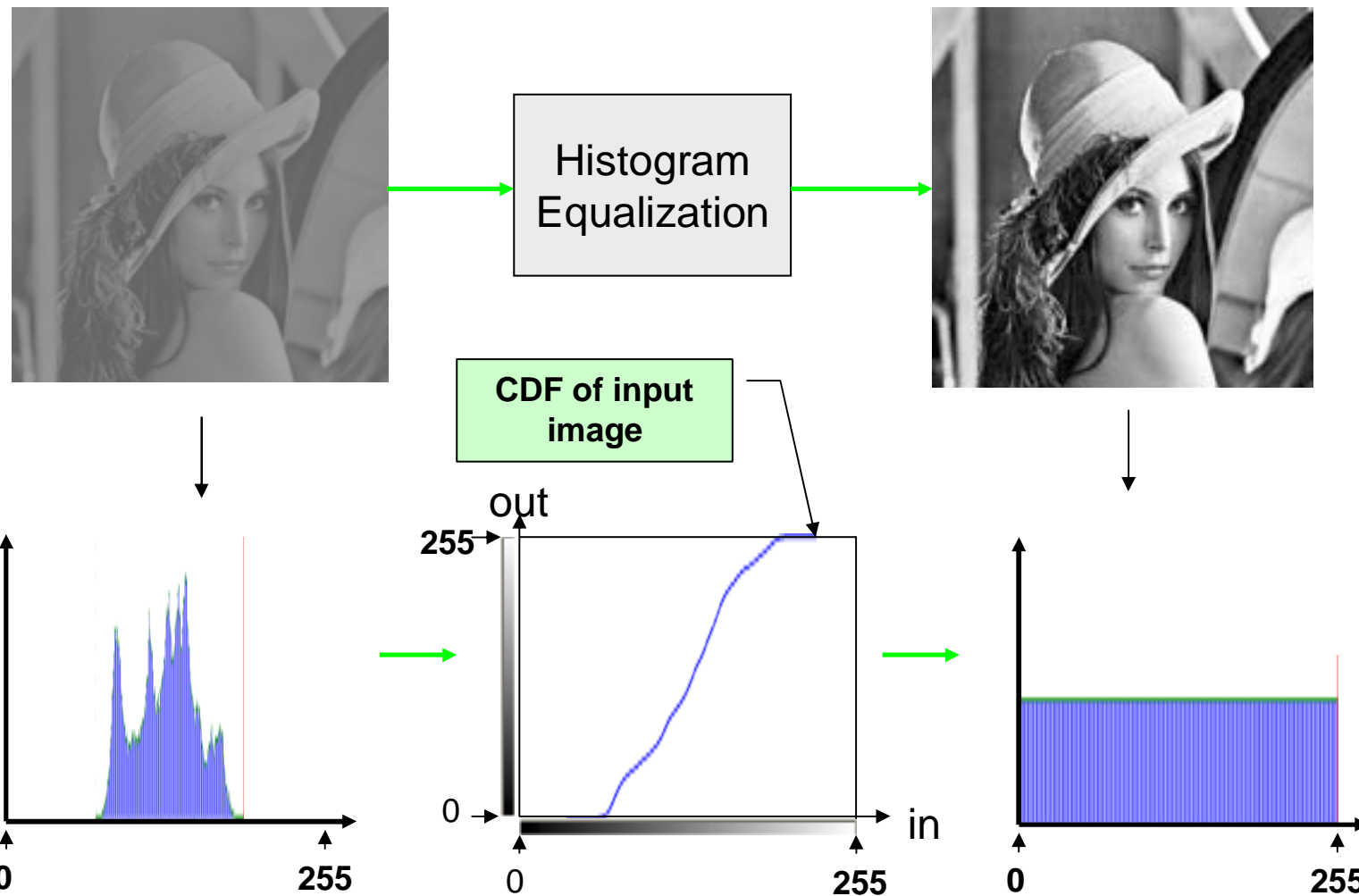
- Point operations change the histogram





# Histogram Equalization

- Point operations change the histogram



# Histogram Equalization Applications

- Histogram matching
  - Convert histograms of input images into flat
- Image comparison
- Image segmentation

# Summary

- Histogram
  - Probability density function
  - Cumulative density function
- Histogram and point operation
- Histogram equalization