INTENSITY
TRANSFORMATIONS
Pixel to Pixel mapping

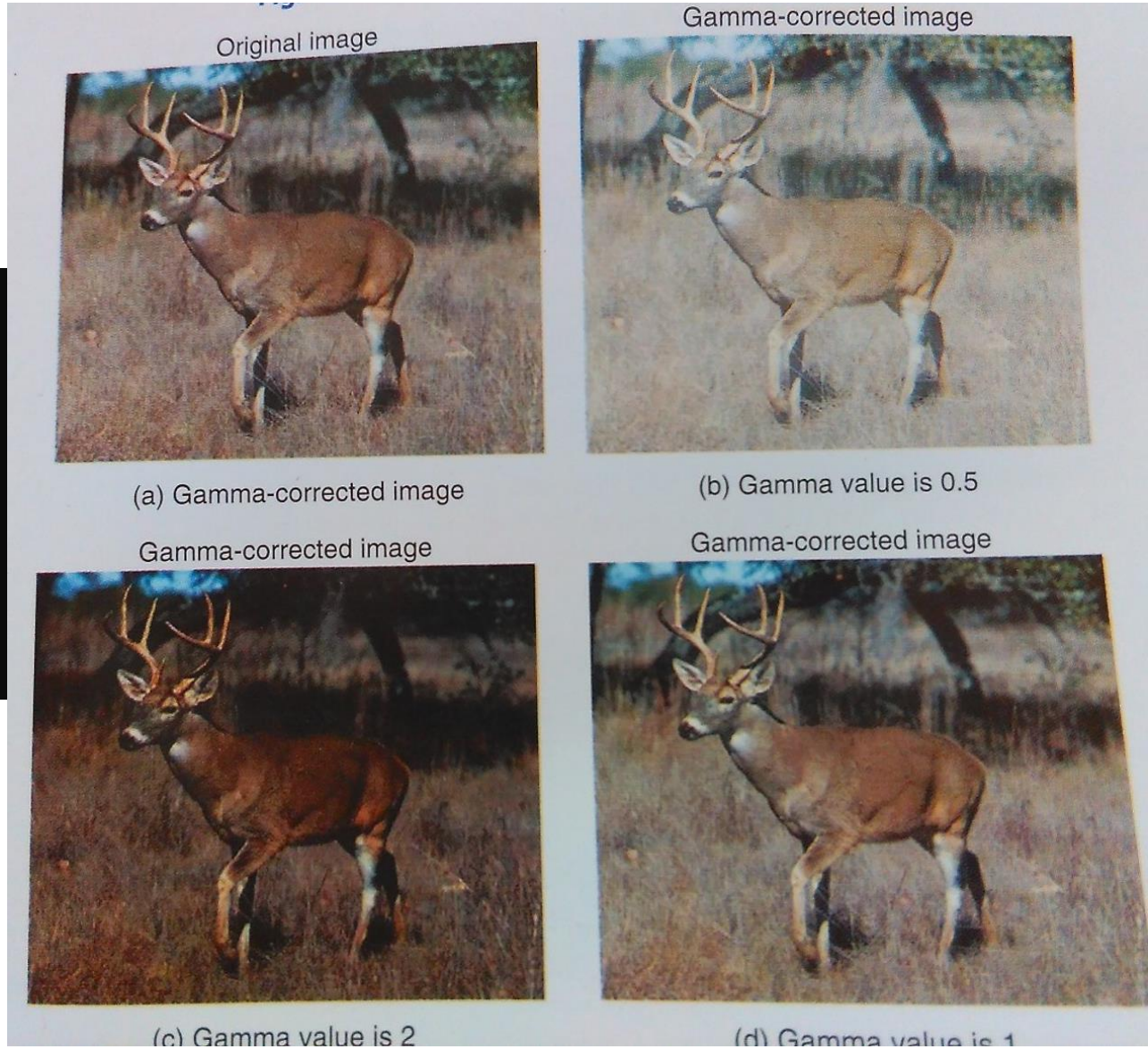
GAMMA CORRECTION

1. Input image
2. Determine the maximum pixel intensity
3. Select the value of Gamma
4. Look-up table formation
5. Mapping of input pixel values to values in Look-up-table

GAMMA CORRECTION

Look-up-table = Max intensity * {[0 : Max intensity]/Max intensity}$^{\gamma}$

GAMMA CORRECTION

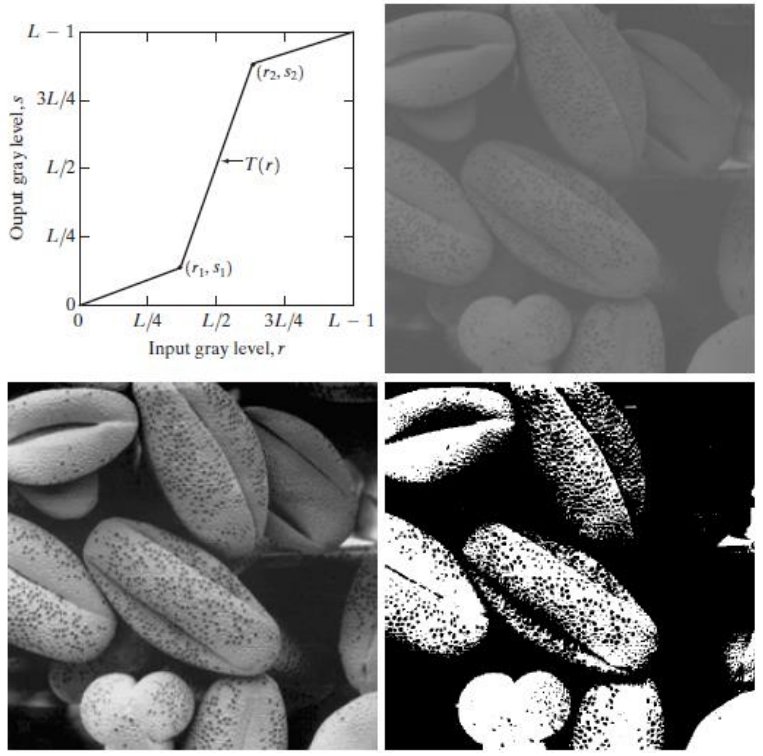


CONTRAST STRETCHING

Contrast stretching is a process that expands the range of intensity levels in an image

so that it spans the full intensity range of the recording medium or display device.

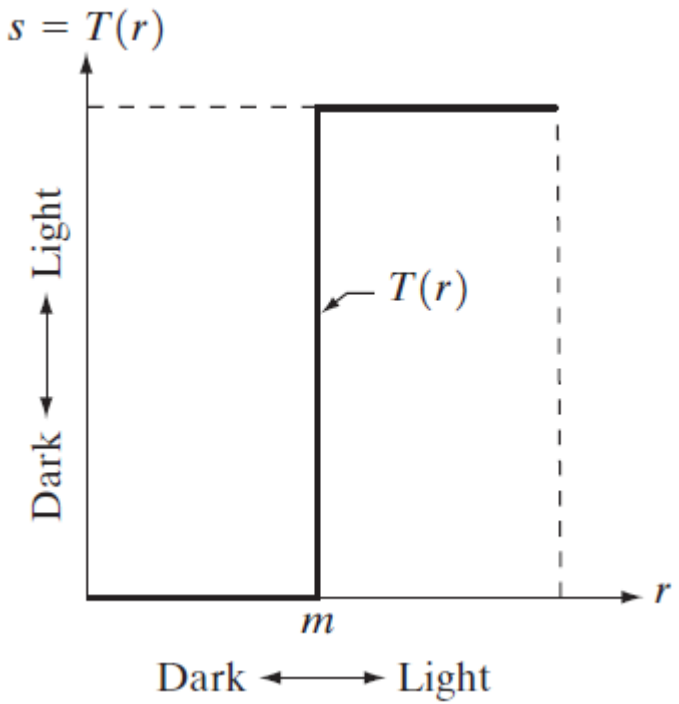
Contrast-stretching transformations increase the contrast between the darks and the lights



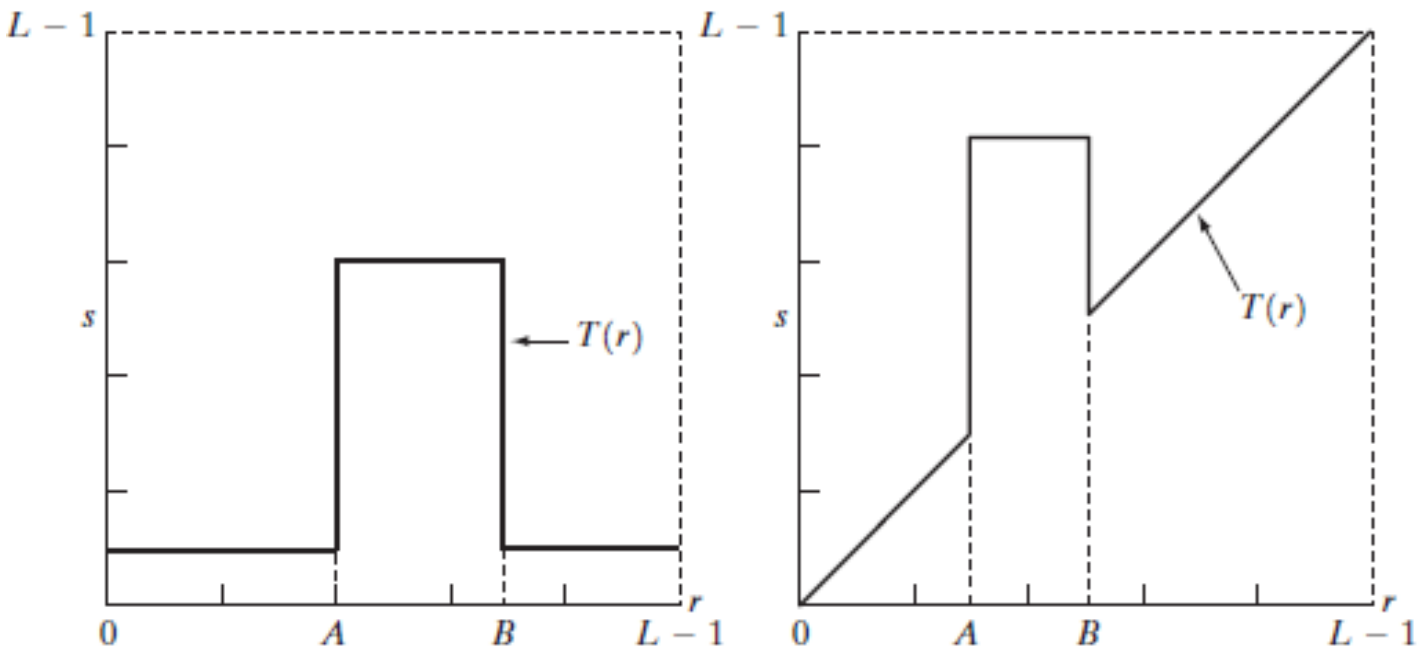
a b
c d

FIGURE 3.10 Contrast stretching. (a) Form of transformation function. (b) A low-contrast image. (c) Result of contrast stretching. (d) Result of thresholding. (Original image courtesy of Dr. Roger Heady, Research School of Biological Sciences, Australian National University, Canberra, Australia.)

THRESHOLDING FUNCTION



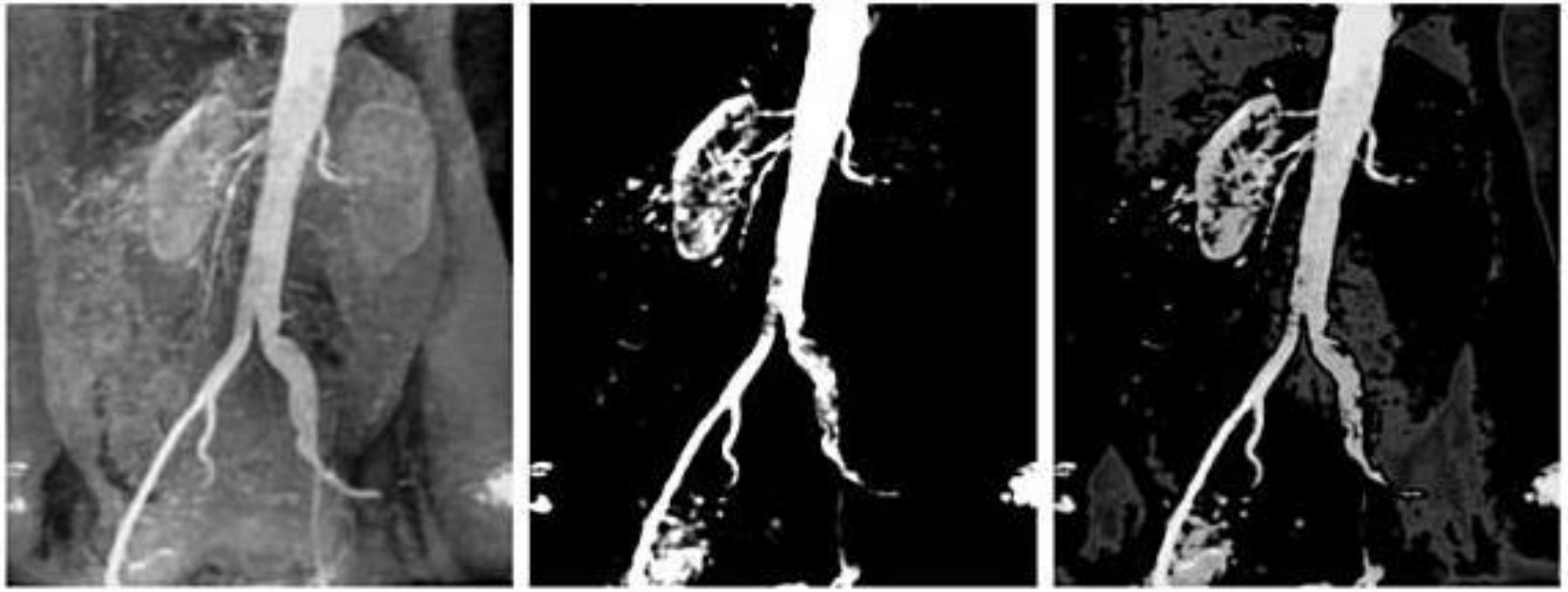
INTENSITY-LEVEL SLICING



a b
c d

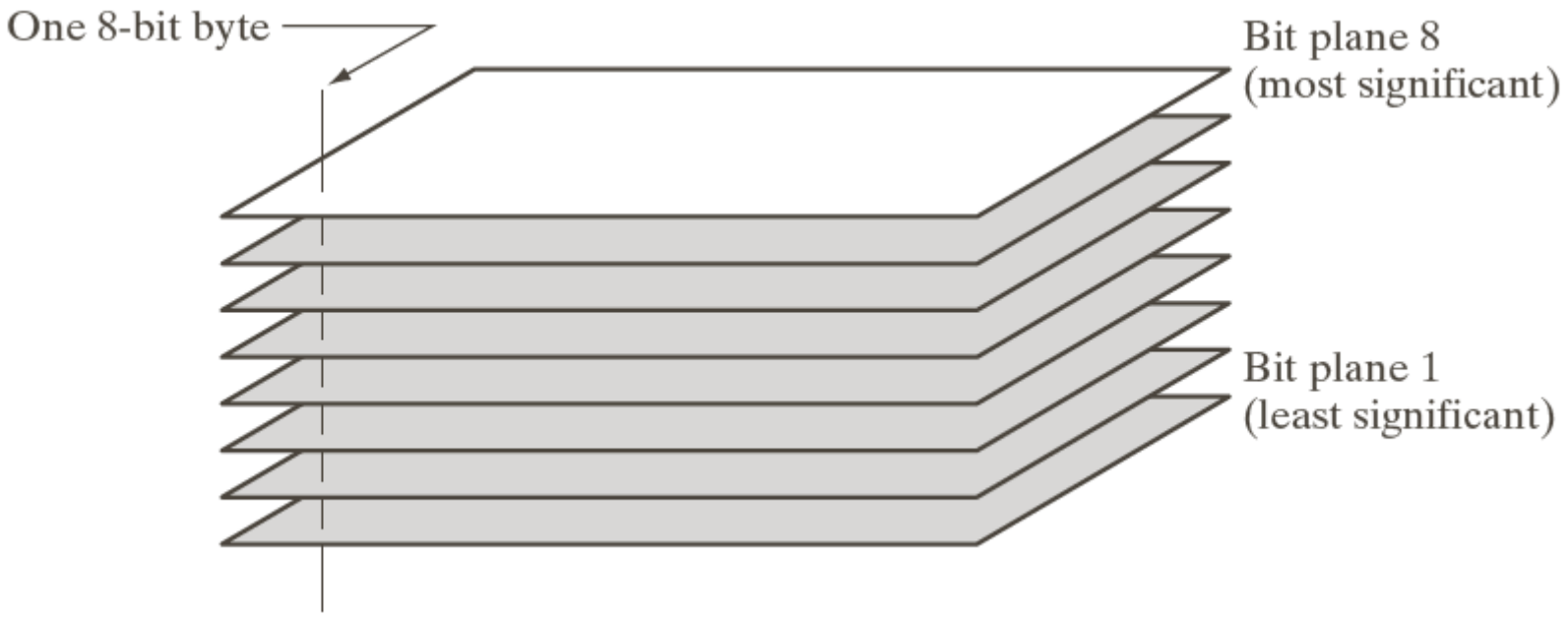
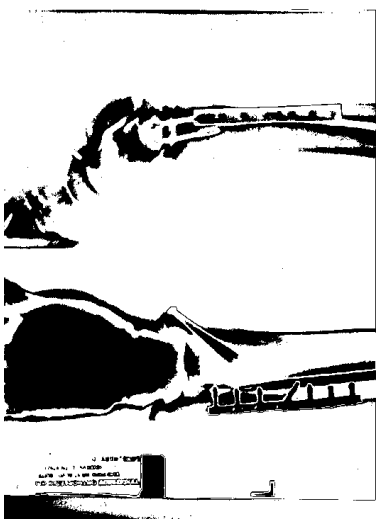
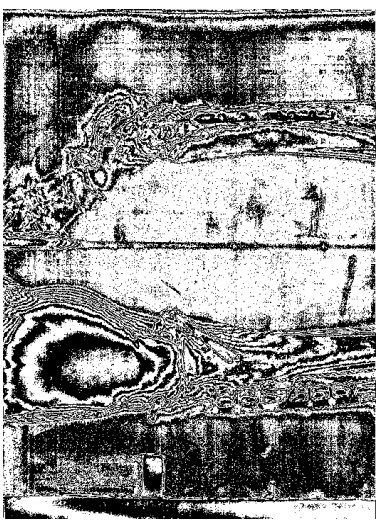
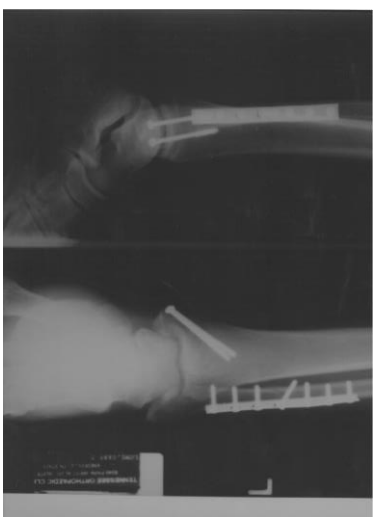
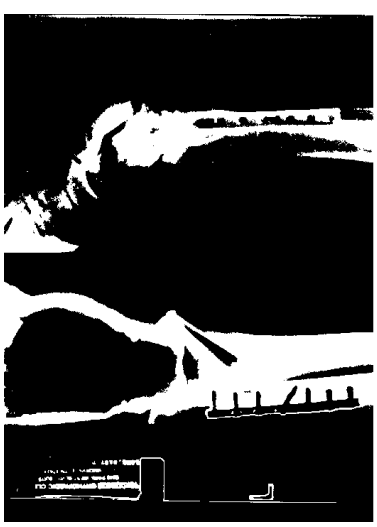
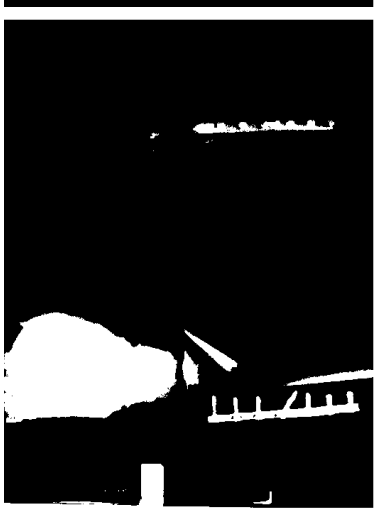
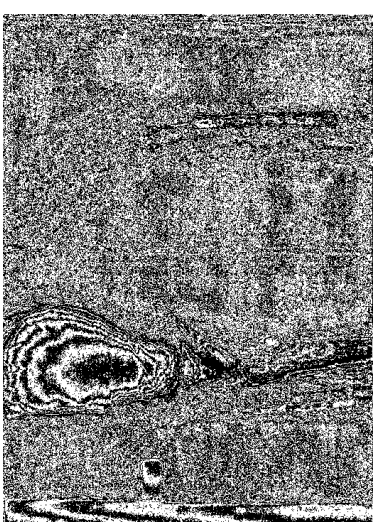
FIGURE 3.11
(a) This transformation highlights range $[A, B]$ of gray levels and reduces all others to a constant level. (b) This transformation highlights range $[A, B]$ but preserves all other levels

INTENSITY-LEVEL SLICING



a b c

FIGURE 3.12 (a) Aortic angiogram. (b) Result of using a slicing transformation of the type illustrated in Fig. 3.11(a), with the range of intensities of interest selected in the upper end of the gray scale. (c) Result of using the transformation in Fig. 3.11(b), with the selected area set to black, so that grays in the area of the blood vessels and kidneys were preserved. (Original image courtesy of Dr. Thomas R. Gest, University of Michigan Medical School.)

BIT PLANE SLICING

- Highlighting the contribution made by a specific bit.
- For images, each pixel is represented by 8 bits.
- Each bit-plane is a binary image