

Spatial Domain Representations of Natural Images

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Image Representation

SPATIAL DOMAIN REPRESENTATIONS

Different Image Types

- Binary images (0 or 1)
- Gray images ([0, 255] or 8 bits/pixel)
- Color images
 - Indexed color images (based on palette)
 - Full color images (24 bits/pixel, 8 bits for red, 8 bits for green, and 8 bits for blue)

Is this a binary image or a gray image?



This is a halftoned image. It looks like a gray image, but it is a binary image.

Perceived Gray Tone

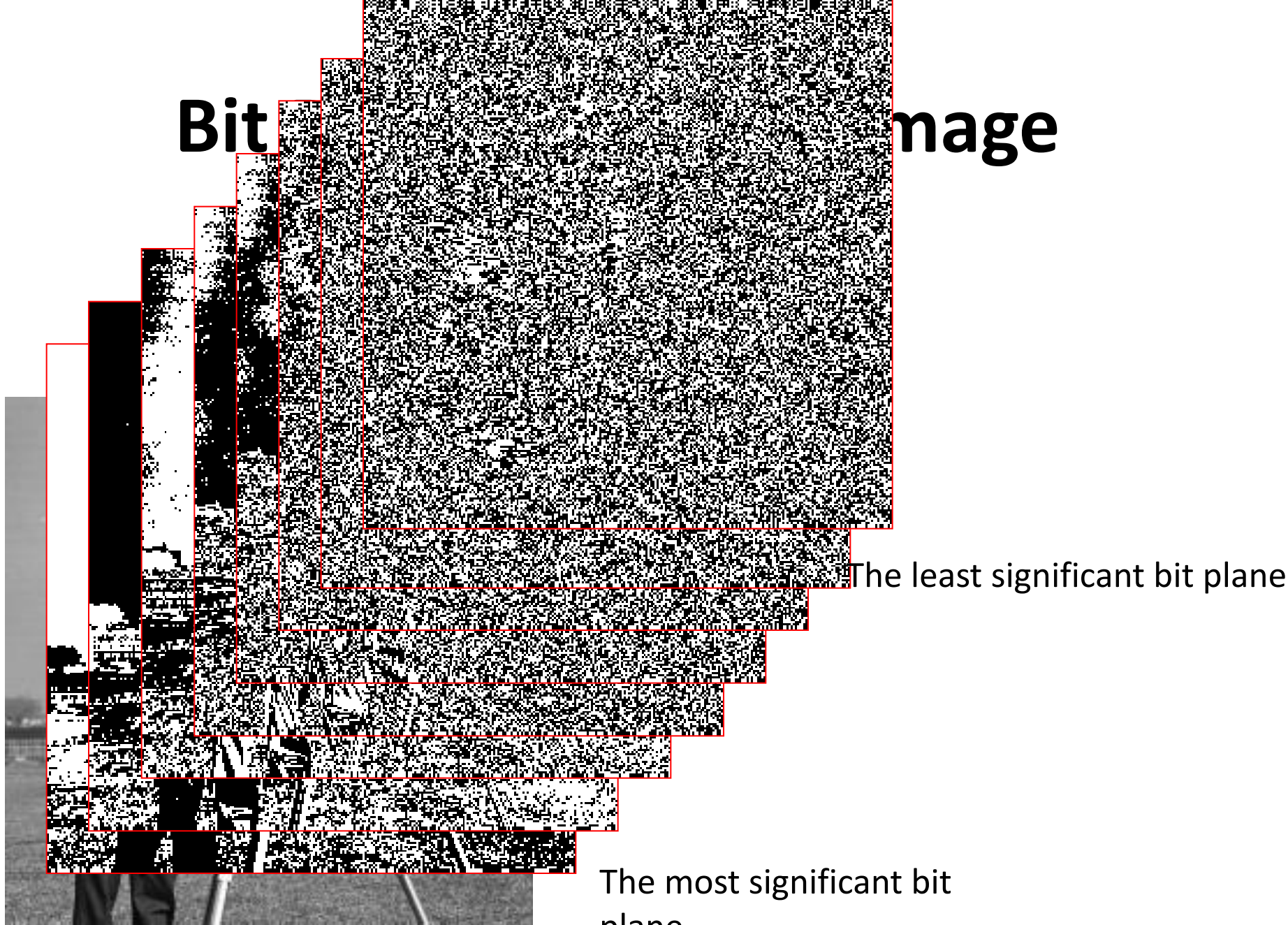


Lena



Halftoned Lena

Bit Image



A standard gray image

The most significant bit plane

The least significant bit plane

Bit Depth (# of Gray Levels)

256



32



16



8



4



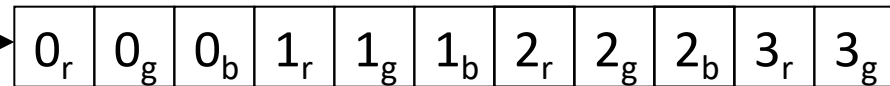
2



Full Color Images

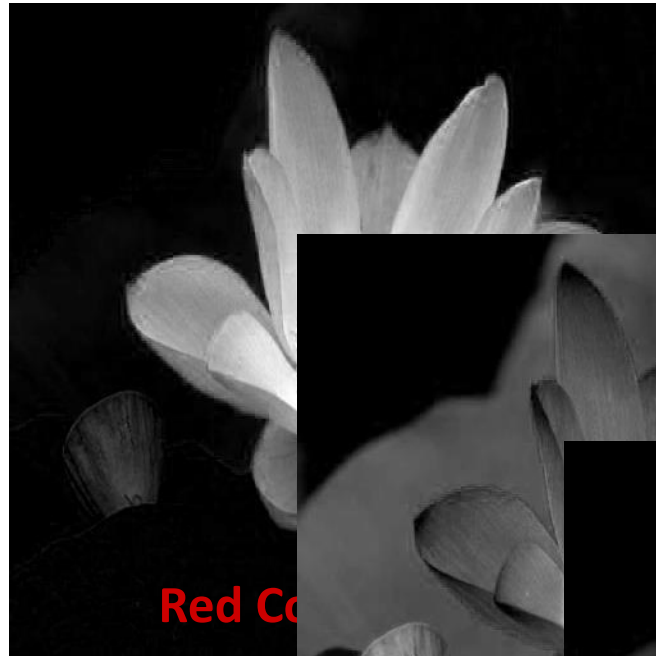
- 24 bits per pixel, and the three channels R G B are three gray images respectively.

```
class Image {  
    unsigned int width;  
    unsigned int height;  
    unsigned char *data;  
}
```



0 _{r,g,b}	1 _{r,g,b}	2 _{r,g,b}
3 _{r,g,b}	4 _{r,g,b}	5 _{r,g,b}
6 _{r,g,b}	7 _{r,g,b}	8 _{r,g,b}

Color Components of a Color Image



An Indexed Color Image

















Color Table

0	
1	
2	
3	
4	
5	
6	
7	

Pixel Data

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

Image

A GIF Image



Thank You!

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