

Images need to be stored and processed using binary. The simplest image format is for an image to be stored as a **bitmap image**. Bitmap images are made up of **picture elements** called **pixels**. These contain a mapping of the colour of each pixel to bits.

Black and white images have two colours (black and white) which can be stored with 1 bit per pixel.

Bitmap image file

```

00011110000
00100011000
001010101000
001000001000
001101011000
000110110001
000001000011
000111110110
000101011100
000101000000
011101000000
010011100000
000011110000
000110110000
000100010000
000100010000
000100010000
000100010000
000100010000
001100011000
000000000000
    
```

Images that have different shades of gray are called **grayscale images**. We can use more bits to store the level of gray each pixel will have. The number of bits used for each pixel is called the **colour depth**.

Type of image	Bitmap	Grayscale	Grayscale
Example			
Colour depth	1 bit/pixel	2 bits/pixel	8 bits/pixel
Total number of colours	2	4	256

Full colour images store 8 bits for each of red, green and blue colours (**RGB**). These correspond to the sub-pixels on a computer display. This allows for  $2^{24}$  (about 16.8 million) different colours. These can be written as 6 digits of hexadecimal. For example, FFFFFFFF is white and FF0000 is red.