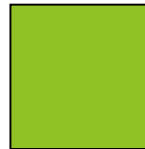


Exercises

Imagine you have taken a picture with a 4 megapixel digital camera. For ease of calculation, assume that the picture is square, not rectangular.



4 million pixels

Assume that you are printing this picture out on a printer that has approximately 4000 dots per inch. How many inches across would the picture be when it was printed?

▶ $4,000,000 = 2000 * 2000$

Therefore the picture would take up 0.5 by 0.5 inches.

If you viewed this image on a screen that had 1000 dots across, what portion of the image would be visible?

▶ You would see $\frac{1}{2}$ the width and $\frac{1}{2}$ the height.

▶ Therefore you would see: $\frac{1}{2} * \frac{1}{2} = \frac{1}{4}$ of the image

Exercises

- ▶ How many colours can be represented by 3 bits?
- ▶ $2^3 = 8$ colours
- ▶ How many bits are required to represent 128 different colours?
- ▶ $128 = 2^7$. Therefore 7 bits are required.
- ▶ How much memory would be required to store a black and white image that is 10 pixels high and 5 pixels wide? Show your working.
- ▶ Number of colours = 2^1 . Therefore 1 bit is required per pixel.
Number of pixels = $h * w = 10 * 5 = 50$
Memory needed = $50 * 1 = 50$ bits

Exercises

- ▶ How much memory (in bytes) would be required to store an image that has 256 different colours and is 3 pixels high and 5 pixels wide? Show your working.
- ▶ Number of colours = $256 = 2^8$. Therefore 8 bits or 1 byte are required per pixel.

Number of pixels = $h * w = 3 * 5 = 15$

Memory needed = $15 * 1 = 15$ bytes

Exercises

How much memory (in bits) would be required to store an eight colour image that is 8 pixels high and 10 pixels wide?

- a) 640 bits
- b) 300 bits
- c) 240 bits
- d) 320 bits
- e) 80 bits

Exercises

You are trying to print a square picture taken by a 16 megapixel camera. The printer has a resolution of 5000 dots per inch. How many inches across would the picture be when it was printed?

- a) 1.25 inches
- b) 0.8 inches
- c) 0.64 inches
- d) 3.2 inches
- e) None of the above