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 ½ the width and ½ the height.**
- **Therefore you would see: ½ * ½ = ¼ 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