

# Binary Revision Questions

1 A bit pattern is shown below

$32\ 16\ 8\ 4\ 2\ 1$   
00101101

1.1 Convert the bit pattern shown above to decimal

[1 mark]

$$32 + 8 + 4 + 1 = 45$$

1.2 Convert the bit pattern shown above to hexadecimal. You should show your working

[2 marks]

$8\ 4\ 2\ 1$  |  $8\ 4\ 2\ 1$        $10\ 11\ 12\ 13$   
0010 | 1101      A B C D  
2 | 13  $\rightarrow$  D

Answer: ..... 2D

2 Convert the decimal number 87 into binary

[1 mark]

01010111

~~$128\ 64\ 32\ 16\ 8\ 4\ 2\ 1$   
0 1 0 1 0 1 1 1  
 $64 + 16 + 4 + 2 + 1$~~        $\begin{array}{r} 87 \\ -64 \\ \hline 23 \\ -2 \times 6 \\ \hline 7 \end{array}$

3 Convert the hexadecimal number 4C into decimal. Show your working.

[2 marks]

$$4 \times 16 = 64$$

$$C \Rightarrow 12$$

$$64 + 12 = 76$$

Answer: ..... 76

4 Add together the two binary numbers shown below. Give your answer in binary.

[1 mark]

01000101  
+ 00010011  
-----  
01011000  
  '  '  '

5 Add together the two binary numbers shown below. Give your answer in decimal.

[2 marks]

$$\begin{array}{r}
 00010111 \\
 + 00100100 \\
 \hline
 00111011 \\
 \hline
 \end{array}$$

32 16 8 2 1  
 00111011  
 32 + 16 + 8 + 2 + 1 = 59

Answer: ..... 59 .....

6 Add together the three binary numbers shown below. Give your answer in binary.

[2 marks]

$$\begin{array}{r}
 01001111 \\
 00010010 \\
 + 01000010 \\
 \hline
 10100011 \\
 \hline
 \end{array}$$

7 A bit pattern is shown below.

$$001110110$$

7.1 Apply a logical binary shift of one place to the right on the bit pattern shown

[1 mark]

00111011

7.2 What is the mathematical effect of applying a logical binary shift of one place to the right on a bit pattern?

[1 mark]

Halves it

128  
64  
32  
16  
8  
4  
2  
1  
+  
-----  
255

8 An eight-bit binary number is called a Byte. What is the largest number that can be represented using one Byte?

255

[1 mark]

9 Jasper has an image file which is 2,400 Bytes in size.

9.1 Convert 2,400 Bytes to kilobytes.

1 kb = 1000 bytes  
∴ 2400 ÷ 1000 = 2.4

[1 mark]

Answer: 2.4 kb

10 Jasmine has a sound file which is 4MB in size.

10.1 What does the abbreviation MB mean?

Megabyte

[1 mark]

10.2 Convert the size of Jasmine's file to Bytes. Show your working.

4 x 1000 kb = 4000 kb  
4000 x 1000 B = 4,000,000 B

[2 marks]

Answer: 4,000,000 B

11 Jilly has a text file which is 10 Bytes in size. Convert the size of Jilly's file to bits. Show your working.

8 bits in a byte  
∴ 10 x 8 = 80 bits

[2 marks]

Answer: 80 b

12 How many bits are there in 2MB? Show your working.

[2 marks]

$$\begin{aligned}2\text{MB} &= 2 \times 1000 = 2000 \text{ kB} \\2000 \text{ kB} &= 2000 \times 1000 = 2,000,000 \text{ B} \\2,000,000 \times 8 &= 16,000,000 \text{ b}\end{aligned}$$

Answer: 16,000,000 b

13 Josie has a bitmap image which is 10 pixels wide, 5 pixels high and uses 8 bits to represent each colour.

13.1 How many different colours can Josie's bitmap image contain?

[1 mark]

256

13.2 Calculate the file size of Josie's bitmap image. Show your working.

[2 marks]

$$\begin{aligned}\text{size} &= h \times w \times \text{bits} \\&= 10 \times 5 \times 8 \\&= 50 \times 8 = 400 \text{ b}\end{aligned}$$

Answer: 400 bits

14 Jim has a sound file which is 10 seconds long. It has been sampled using 16 bit sampling resolution at a sampling rate of 10kHz.

14.1 Calculate the file size of Jim's sound file. Show your working.

[3 marks]

$$\begin{aligned}\text{size} &= \text{length} \times \text{bits} \times \text{rate} \\&= 10 \times 16 \times 10,000 \\&= 160 \times 10,000 \\&= 1,600,000 \text{ bits}\end{aligned}$$

Answer: 1,600,000 bits