

Homework 1 Solutions

1. Convert the following; fill in n with the proper value.

(a) $52_{10} = n_2 = 110100_2$

(b) $522_{10} = n_2 = 100000101_20$

(c) $1000001001_2 = n_{10} = 1031_{10}$

(d) $111_{10} = n_2 = 1101111_2$

(e) $111_{16} = n_{10} = 273_{10}$

(f) $12D4_{16} = n_{10} = 4820_{10}$

(g) $ABC_{16} = n_2 = 101010111100_2$

Remember the easy way to do this: Each Hex value is made up of four binary digits. So $A = 10_{10} = 1010_2$, $B = 1011_2$, and $C = 1100_2$. Stick it all together, and you have your answer.

(h) $1234_{10} = n_8 = 2322_8$ Use the same division techniques as before, only replace the base (the divisor) by 8 rather than 2.

(i) $1234_7 = n_{10}$

Use the same expansion techniques as before, only replace the base by 7:

$$\begin{aligned} 1234_7 &= 1 \times 7^3 + 2 \times 7^2 + 3 \times 7^1 + 4 \times 7^0 \\ &= 343 + 98 + 21 + 4 \\ &= 466_{10} \end{aligned}$$

2. Give a reasonable hex value for a very dark green color.

Many answers are reasonable here, such as **#103310**. The idea is that you have a low value in green, with some lower values or even zero for red and blue.

3. Describe the approximate color for each of the following. Explain.

(a) **#AAAAAA**

Since all three of the color have the same value, it must be gray. Furthermore, because A is on the higher end of the scale, that means it must be a light gray as opposed to a dark gray.

(b) #BC00CB

This is an almost perfect mix of red and blue, which is violet. Since the values are quite high, it would be rather bright.

4. When referring to computer storage, **exactly** how many bytes are there in 3.5MB?

1 MB, in terms of storage, is $2^{20} = 1048576$ B. Thus $3.5 \times 1048576 = 3670016$ B.

5. A phone network runs at 120Mbps. How many seconds will it take to transfer an image of size 63MB?

Mbps means megab**its** per second, while MB refers to **bytes**. So convert 120Mbps to bytes by dividing by 8 = 15MBps = 15000000Bps. $63\text{MB} = 63 \times 2^{20} = 66060288$ B. Finally, $\frac{66060288B}{15000000Bps} \approx 4.404$ seconds.