1. How many bits does one hexadecimal digit represent?

   ☐ 16

   ☐ 1

   ☐ 4

   ☐ 8

2. Add the binary numbers ‘0101‘ + ‘0011‘. Give the 4-bit result.

   _____

3. How many different characters can 7-bit ASCII represent?

   _____

4. How many bytes are in 1 kibibyte (KiB)?

   _____ bytes

5. Convert binary ‘10010110‘ to denary.

   _____

6. Overflow in an 8-bit register happens when:

   ☐ the result is larger than 255 and needs a 9th bit

   ☐ the register is empty before the addition begins

   ☐ a bit is shifted right and falls off the end of the register

   ☐ one of the numbers being added is negative in two’s complement

7. Compared with ASCII, Unicode:

   ☐ uses fewer bits per character, so text files become smaller

   ☐ uses exactly the same number of bits as ASCII for every symbol

   ☐ represents far more characters but uses more bits, so files are larger

   ☐ can only store English letters, digits and punctuation

8. An image is 100 × 100 pixels with a colour depth of 24 bits. What is its size in bits?

   _____ bits

9. Convert denary 13 to binary (significant bits only).

   _____

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_____

1. **4**

   One hex digit covers 16 values = a nibble = 4 bits.

2. **1000**

   5 + 3 = 8 = ‘1000‘.

3. **128**

   7 bits give 2^7 = 128 characters.

4. **1024 bytes**

   1 KiB = 1024 bytes (each storage unit steps up by 1024 = 2^10).

5. **150**

   128 + 16 + 4 + 2 = 150.

6. **the result is larger than 255 and needs a 9th bit**

   An 8-bit register holds 0–255; a bigger result needs a 9th bit that cannot fit, so it is lost.

7. **represents far more characters but uses more bits, so files are larger**

   Unicode covers many languages and emoji, needing more bits – so the same text is larger than in ASCII.

8. **240000 bits**

   width × height × colour depth = 100 × 100 × 24 = 240 000 bits.

9. **1101**

   13 = 8 + 4 + 1 → ‘1101‘.

10. **2**

    Each left-shift place multiplies by 2 (a right shift divides by 2).

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