

1. Data representation

Starter Quiz · 课前小测

IGCSE Computer Science

Name: _____ Score: _____

1. How many bits does one hexadecimal digit represent?

- ☐ 4
- ☐ 1
- ☐ 8
- ☐ 16

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 numbers are negative
- ☐ a bit is shifted right
- ☐ the register is empty

7. Compared with ASCII, Unicode:

- ☐ represents far more characters but uses more bits, so files are larger
- ☐ uses fewer bits per character
- ☐ can only store English
- ☐ is the same size

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).

10. A logical left shift by 1 multiplies an unsigned number by what?

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1. **4**

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

2. **1000**

$5 + 3 = 8 = \text{'1000'}$.

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**

$\text{width} \times \text{height} \times \text{colour depth} = 100 \times 100 \times 24 = 240\,000$ bits.

9. **1101**

$13 = 8 + 4 + 1 \rightarrow \text{'1101'}$.

10. **2**

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