

1. Information representation

Starter Quiz · 课前小测

A-Level 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. A character set such as ASCII defines:

- ☐ a numeric code point for each character
- ☐ the colour of each pixel
- ☐ the speed of the processor
- ☐ how files are compressed

4. The colour depth (bit depth) of a bitmap image is:

- ☐ the number of bits used to store each pixel
- ☐ the number of pixels across the image
- ☐ the physical size of the screen
- ☐ how much the file is compressed

5. What does sampling do?

- ☐ measures the amplitude of an analogue wave at regular intervals and stores each as a binary number
- ☐ makes the sound louder
- ☐ removes frequencies the ear cannot hear
- ☐ converts digital data into analogue data

6. Lossless compression means:

- ☐ the exact original data can be recovered
- ☐ some detail is permanently lost
- ☐ the file gets bigger
- ☐ the data is encrypted

7. How many bits are in one byte?

_____ bits

8. How many different code points does 7-bit ASCII have?

9. How many bits of colour depth are needed to store 256 different colours?

_____ bits

10. Lossless compression rebuilds the original data exactly (needed for text and programs), while lossy compression permanently removes some data to shrink the file (used for photos and audio).

☐ True ☐ False

1. **4**

One hex digit (0–F) covers 16 values = 2^4 , so it maps to exactly 4 bits (a nibble).

2. **1000**

$5 + 3 = 8$, which is ‘1000’ in binary.

3. **a numeric code point for each character**

A character set maps each character to a number (its code point), which is what the computer actually stores.

4. **the number of bits used to store each pixel**

Colour depth is bits per pixel — more bits means more possible colours (8 bits $\rightarrow$ 256, 24 bits $\rightarrow$ 16.7 million).

5. **measures the amplitude of an analogue wave at regular intervals and stores each as a binary number**

Sampling turns a continuous analogue wave into discrete digital values. Removing inaudible frequencies is lossy compression, a different step.

6. **the exact original data can be recovered**

Lossless compression lets you rebuild the original data exactly — essential for text, programs and ZIP/PNG.

7. **8 bits**

A byte is 8 bits (and a nibble is 4 bits).

8. **128**

7 bits give $2^7 = 128$ code points.

9. **8 bits**

$2^8 = 256$, so 8 bits per pixel give 256 colours.

10. **True**

That is why a program or a ZIP must be lossless, but a photo or a song can use lossy compression.