Your notes

KS3 Computing: revision notes

Binary and data

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Binary

- Computers use **binary** (base 2) because their circuits are either off (0) or on (1).
- A bit is a single 0 or 1. A nibble is 4 bits. A **byte** is 8 bits.
- In an 8-bit number, the place values are 128, 64, 32, 16, 8, 4, 2 and 1. So 00001101 = 8 + 4 + 1 = 13, and the largest 8-bit number, 11111111, is 255. 8 bits can store 256 different values (0 to 255).
- To convert **denary** to **binary**, take away the biggest place values that fit: 45 = 32 + 8 + 4 + 1 = 00101101.

Binary addition and hexadecimal

- **Binary** addition rules: 0 + 0 = 0, 0 + 1 = 1, 1 + 1 = 10 (write 0, carry 1), and 1 + 1 + 1 = 11 (write 1, carry 1).
- **Overflow** happens when the answer needs more bits than are available.
- **Hexadecimal** (base 16) uses the digits 0 to 9 and the letters A to F (10 to 15). One hex digit stands for 4 bits, so hex is a short way of writing **binary**: FF = 255.

Units

- 1 kilobyte (KB) = 1000 **bytes**; 1 megabyte (MB) = 1000 KB; 1 gigabyte (GB) = 1000 MB; 1 terabyte (TB) = 1000 GB. (You may also see 1024 used.)

Text, images and sound

- A **character set** gives each character a **binary** code. **ASCII** uses 7 bits for 128 characters (A is 65). Unicode has far more, including other alphabets and emoji.
- An image is made of **pixels**. **Colour depth** is the number of bits per **pixel**: 1 bit gives 2 colours, and 8 bits give 256 colours. Resolution is the number of pixels.
- More **pixels** or a greater **colour depth** gives better quality but a bigger file.
- Sound is stored by taking samples of the sound wave many times a second.

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Key terms

Binary	The base-2 number system, using only 0 and 1.
Bit	A single binary digit, 0 or 1.
Byte	A group of 8 bits.
Denary	The base-10 number system we normally use.
Overflow	When a result needs more bits than are available.
Hexadecimal	The base-16 number system, using 0 to 9 and A to F.
Character set	A list of characters and the binary codes that represent them.
ASCII	A character set that uses 7 bits for 128 characters.
Unicode	A character set with codes for many more characters, including emoji.
Pixel	A single dot of colour in an image.
Colour depth	The number of bits used for the colour of each pixel.
Resolution	The number of pixels in an image.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is a bit?
2. How many bits are there in a byte?
3. What is the binary number 00001101 in denary?
4. What is the largest number that can be stored in 8 bits?
5. What is 45 in 8-bit binary?
6. What is 1 + 1 in binary?
7. What is overflow?
8. How many bytes are there in a kilobyte?

Answers

1. A single binary digit, 0 or 1
2. 8
3. 13
4. 255
5. 00101101
6. 10
7. When a result needs more bits than are available
8. 1000

What to do next

Practise 14 questions on this topic

Your notes

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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