

# Topic 1: Information Representation

EAL keyword sheet - Cambridge International AS & A Level Computer Science 9618. Write the word in your own language in the last column.

| Keyword                           | Meaning                                                              | Example sentence                                                | In my language |
|-----------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------|----------------|
| <b>binary</b>                     | A number system that uses only 0 and 1.                              | <i>Computers store all data in binary.</i>                      |                |
| <b>denary</b>                     | The normal base-10 number system, using digits 0 to 9.               | <i>The denary number 10 is 1010 in binary.</i>                  |                |
| <b>hexadecimal</b>                | A base-16 number system with the digits 0-9 and A-F.                 | <i>Hexadecimal is used to show memory addresses.</i>            |                |
| <b>BCD (binary-coded decimal)</b> | Each denary digit is stored as its own 4-bit binary group.           | <i>In BCD, 59 is stored as 0101 1001.</i>                       |                |
| <b>two's complement</b>           | A method for storing positive and negative whole numbers in binary.  | <i>In two's complement, the left bit has a negative value.</i>  |                |
| <b>overflow</b>                   | An error when a result is too big to fit in the available bits.      | <i>Overflow occurs when 8 bits cannot store the answer.</i>     |                |
| <b>logical shift</b>              | Moving the bits left or right and filling empty places with 0.       | <i>A left shift doubles the value.</i>                          |                |
| <b>arithmetic shift</b>           | A shift that keeps the sign bit the same.                            | <i>An arithmetic right shift divides a signed number by 2.</i>  |                |
| <b>character set</b>              | A list of characters, each with a binary code.                       | <i>ASCII and Unicode are character sets.</i>                    |                |
| <b>ASCII</b>                      | A character set that uses 7 or 8 bits for each character.            | <i>ASCII is limited to English characters.</i>                  |                |
| <b>Unicode</b>                    | A very large character set that supports almost all world languages. | <i>Unicode needs more bits than ASCII.</i>                      |                |
| <b>bitmap image</b>               | An image made of a grid of pixels.                                   | <i>A bitmap image loses quality when enlarged.</i>              |                |
| <b>vector graphic</b>             | An image made of shapes described by mathematical properties.        | <i>A vector graphic can be enlarged without losing quality.</i> |                |
| <b>pixel</b>                      | The smallest dot of colour in a bitmap image.                        | <i>Each pixel is stored as a binary number.</i>                 |                |
| <b>resolution</b>                 | The number of pixels in an image.                                    | <i>A higher resolution gives a sharper image.</i>               |                |

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|---------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|----------------|
| <b>colour depth</b>                   | The number of bits used to store the colour of each pixel.   | <i>A 24-bit colour depth gives millions of colours.</i>          |                |
| <b>sampling</b>                       | Measuring a sound wave at regular intervals.                 | <i>Sampling converts analogue sound to digital.</i>              |                |
| <b>sampling rate</b>                  | The number of samples taken per second.                      | <i>CD audio has a sampling rate of 44.1 kHz.</i>                 |                |
| <b>sampling resolution</b>            | The number of bits used for each sample.                     | <i>A higher sampling resolution makes a better recording.</i>    |                |
| <b>analogue</b>                       | Continuous data that can have any value.                     | <i>A sound wave is analogue.</i>                                 |                |
| <b>digital</b>                        | Data stored as separate values, usually binary.              | <i>A computer can only store digital data.</i>                   |                |
| <b>file compression</b>               | Reducing the size of a file.                                 | <i>File compression saves storage and bandwidth.</i>             |                |
| <b>lossy compression</b>              | Compression that permanently removes some data.              | <i>MP3 uses lossy compression.</i>                               |                |
| <b>lossless compression</b>           | Compression where the original data can be restored exactly. | <i>A ZIP file uses lossless compression.</i>                     |                |
| <b>run-length encoding (RLE)</b>      | Storing repeated values as a count and the value.            | <i>RLE works well on images with large blocks of one colour.</i> |                |
| <b>bit rate</b>                       | The number of bits processed for each second of media.       | <i>A higher bit rate means better quality but a bigger file.</i> |                |
| <b>kibibyte / mebibyte / gibibyte</b> | Units of 1024 bytes, 1024 KiB and 1024 MiB.                  | <i>A photo may be several MiB.</i>                               |                |