

Topic 1: Information Representation

Keyword sheet - Cambridge AS & A Level Computer Science 9618. Tick each term once you can define it from memory.

Keyword	Definition	Know it?
Binary-coded decimal (BCD)	Each denary digit is stored as a separate 4-bit binary value, simplifying conversion for display (e.g. calculators).	
Two's complement	Signed integer representation in which the MSB has a negative place value; negate by inverting bits and adding 1. Range for n bits: $-2^{(n-1)}$ to $2^{(n-1)}-1$.	
Overflow	A calculation result exceeds the range that can be stored in the available bits.	
Logical shift	Bits move left or right and vacated positions are filled with 0.	
Arithmetic shift	Shift that preserves the sign bit, so signed values are correctly multiplied or divided by powers of 2.	
Character set	Defined set of characters mapped to binary codes, e.g. ASCII, Unicode.	
Unicode	Universal character set that uses multiple bytes per character (e.g. UTF-8, UTF-16) to represent virtually all writing systems.	
Bitmap image	Image stored as a grid of pixels, each with a binary colour value; resolution-dependent.	
Vector graphic	Image stored as mathematical descriptions of geometric objects (drawing list); scalable without loss of quality.	
Resolution / colour depth	Number of pixels / number of bits per pixel; both increase file size.	
Sampling rate / resolution	Samples per second / bits per sample in digitised sound; higher values increase fidelity and file size.	
Analogue-to-digital converter (ADC)	Converts continuous analogue signals into digital values by sampling.	
Bit rate	Number of bits processed per second of audio or video.	
Lossy compression	Irreversibly discards data (e.g. psychoacoustic or visual detail) to reduce file size; e.g. MP3, JPEG.	
Lossless compression	Reduces file size while allowing exact reconstruction; e.g. RLE, PNG.	
Run-length encoding (RLE)	Replaces runs of identical values with a count-value pair; effective for data with long runs.	
Kibibyte / mebibyte / gibibyte	Binary prefixes: 2^{10} , 2^{20} and 2^{30} bytes respectively.	