

Kemnal Technology College – Computer Science Kemnal Key – Year 8 Term 2

KEMNAL KEY QUESTIONS

1. What is Binary?
2. Where is Binary used in a computer?
Examples
3. Explain what Algorithms are?
4. Demonstrate RLE?

What is Digital Literacy?

All data is represented as binary digits, whether it is numbers, text, images or sound. Calculations are also done in binary.

Binary to denary

Binary has just two units, 0 and 1. The value of each binary place value is calculated by multiplying the previous place value by two. The first eight binary place values are:

128 64 32 16 8 4 2 1

In binary, each place value can only be represented by 1 or a 0.

To convert binary to denary, simply take each place value that has a 1, and add them together.

Example - binary number 1111100

128	64	32	16	8	4	2	1
0	1	1	1	1	1	0	0

Result: $(0 \times 128) + (1 \times 64) + (1 \times 32) + (1 \times 16) + (1 \times 8) + (1 \times 4) + (0 \times 2) + (0 \times 1) = 124$

Algorithm	Another way of saying rules and instructions in Computer Science. An Algorithm is a step-by-step procedure or set of instructions to achieve an outcome.
Resolution	The fineness of detail that can be seen in an image. The higher the resolution of an image, the more detail it holds. In computing terms, resolution is measured in dots per inch (dpi).
Binary Numbers	A number system that contains two symbols, 0 and 1. This is also known as base 2. All computer data is represented using binary, a number system that uses 0s and 1s.
Denary Numbers	The regular number system you are used to counting in. This uses the numbers 0-9 and place value of multiples of 10.
Pixel	One of the individual units (often called dots) that make up an image.
Bitmap images	Are organised as a grid of coloured squares called pixels (short for 'picture elements').
Data compression	To reduce the file size of text, image and audio data in order to transfer it more quickly and so that it takes up less storage space.
RLE	Run-length encoding (RLE) is a form of lossless data compression in which <i>runs</i> of data (sequences in which the same data value occurs in many consecutive data elements) are stored as a single data value and count, rather than as the original run. This is most efficient on data that contains many such runs

Conversion of number systems

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Capacity

Size	Unit
8 bits	1 byte (B)
1,000 bytes (1,000 B)	1 kilobyte (KB)
1,000 kilobytes (1,000 KB)	1 megabyte (MB)
1,000 megabytes (1,000 MB)	1 gigabyte (GB)
1,000 gigabytes (1,000 GB)	1 terabyte (TB)