

Data Storage

Key Words

Binary

A number system that uses two values, 0 and 1.

Denary

A number system that uses ten values, 0-9.

Hexadecimal

A number system that uses sixteen values, 0-9 and A-F.

Transistors

A transistor is a semiconductor that amplifies or switches electronic signals.

Units

A way to measure capacity of data

Binary, Denary and Hex

Binary

Binary is simply a way of representing data in a series of 1s and 0s.

Computers need to store data as binary as computers are made up of tiny switches called transistors, these switches are either a 1 or 0, ON or OFF.

Denary is the number system we use and uses the values 0-9 with the powers of 10 as the units (1s, 10s, 100s etc. Binary uses the powers of 2 (1, 2, 4, 8 etc.)

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

The number above: 01001110 is equal to 77, there is a 1 under 64, 8, 4, and 2 and the **sum** of those numbers is 77.

Denary

Denary is the name given to the number system we use every day.

Denary is a number system that uses 10 numbers, those numbers being:

0,1,2,3,4,5,6,7,8,9

As computers only use values of 1 and 0 denary numbers have to be converted into binary.

An example is 200 = 11001000

Hexadecimal

Hexadecimal is another number systems that can be used with computers. Whereas Binary uses the powers of 2 and Denary uses the powers of 10, hexadecimal uses the powers of 16.

Below is how the 16 numbers are represented in hexadecimal:

Denary: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Hex: 0 1 2 3 4 5 6 7 8 9 A B C D E F

To convert a number from Hex to Denary use the following example:

A6

A = 10

6 = 6

A * 16 = 160

6 * 1 = 6

160 + 6 = 166

A6 = 166

To convert Denary to Hex do the following (right):

166

In Binary is: 10100110

Split = 1010 0110

1010 = 10 = A in Hex

0110 = 6 = 6 in Hex

66 = A6

Binary Addition

Computers also need to make calculations, at the root of the decoding of instructions this will happen in Binary. Binary only works with two states, 1 and 0, therefore all answers must be written as a 1 or 0.

In Denary 1 + 1 = 2, however there is no 2 in binary, it is represented as 10 because there is one 2 and zero 1s.

The main rules are as follows:

0 + 0 = 0

1 + 0 = 1

1 + 1 = 10 or 0 (carry 1)

1 + 1 + 1 = 11 or 1 (carry 1)

An example is below:

Starting from the right:

0 + 1 = 1

1 + 0 = 1

1 + 1 = 0 carry 1, next column

1 + 0 + 0 = 1

Or 0110 = 6, 0101 = 5

6 + 5 = 11 = 1011

1			
0	1	1	0
0	1	0	1
1	0	1	1

Data Units

Data in a computer system is stored in different units such as:

Bit

Nibble (4 bits)

Byte (8 bits)

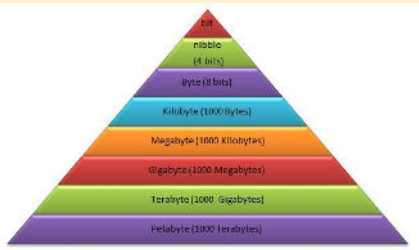
Kilobyte (1000/1024 Bytes)

Megabyte (1000/1024 KB)

Gigabyte (1000/1024 MB)

Terabyte (1000/1024 GB)

Petabyte (1000/1024 TB)



You will also need to know how to find out how many of one unit is in another, for example:

How many GB in MB = 2048MB / 1024 = 2GB

Or

How many KB in MB = 2MB * 1024 = 2048KB

So * to find smaller unit and / to find larger unit.

Quizizz

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