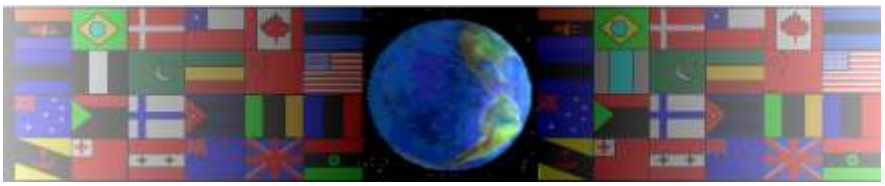
BINARY

On behalf of The World Association of Technology Teachers

W.A.T.T.



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This exercise can be printed and used by teachers and students. It is recommended that you view the website (www.technologystudent.com) before attempting the design sheet .

BINARY NUMBERS

(DECIMAL 10 = BINARY 1010)

Binary numbers are closely related to digital electronics. With digital electronics a '**1**' means that current / electricity is present and a '**0**' means it is not present. The different parts of a computer communicate through pulses of current (1s and 0s).

As we all know, computers can calculate complex equations and perform complex mathematics at lightening speed. Calculating using only 1s and 0s is called the **BINARY SYSTEM**. Although a computer will only process 1s and 0s there comes a point when the 1s and 0s have to be converted into our usual decimal numbers - that we are familiar with.

We tend to use the **DECIMAL SYSTEM** when attempting maths. This system deals with numbers that we are using on a daily basis: 1,2,3,4,5,6,7,8,9, 10s, 100s, 1000s etc..... As the BINARY system is composed of only two numbers (1s and 0s) you may be wandering how it is possible to count beyond one. The table below will help you understand how this is done.

BINARY CONVERSION	64	32	16	8	4	2	1
DECIMAL 10				1	0	1	0
DECIMAL 60		1	1	1	1	0	0
DECIMAL 38		1	O	0	1	1	0
DECIMAL 44							
DECIMAL 19							
DECIMAL 27							
DECIMAL 7							

Look at the row that represents the decimal number 10. The table can be used to convert this decimal number to a binary number. The table shows that DECIMAL 10 is composed of one number 8 and one number 2. Zeros are used to fill the blank spaces which gives 1010 as the binary equivalent of decimal 10.

BINARY CONVERSION	64	32	16	8	4	2	1
DECIMAL 10				1	0	1	0

BINARY NUMBERS

Next look at the way decimal 60 is converted to its binary equivalent. 60 is composed of one 32, one 16, one 8, and one 4. The blanks are filled with zeros giving 111100 as the binary equivalent of decimal 60.

BINARY CONVERSION	64	32	16	8	4	2	1
DECIMAL 60		1	1	1	1	0	0

The important point to remember is that when converting from decimal to binary OR from binary to decimal, you must write down the top section of the table (seen in yellow above) and underneath enter the binary number.

QUESTIONS:

1. What do you notice about the way the numbers along the top section of the table increase - from right to left(yellow section of table)?
2. Complete the table by writing the binary equivalent of decimal numbers 44, 19, 27 and 7, in the spaces available.