HISTORY OF BINARY NUMBERS

The binary numeral system uses on ("1") and off ("2") switches to represent all numbers in our base ten number system. The binary system is used internally by all modern computers.

The ancient Indian mathematician Pingala presented the first known description of a binary numeral system in the 3rd century BC.

The modern binary number system was fully documented by Gottfried Leibniz in the 17th century using 0 and 1, like the modern binary numeral system.

In 1854, British mathematician George Boole published a landmark paper detailing a system of logic that would become known as Boolean algebra. His logical system proved instrumental in the development of the binary system, particularly in its implementation in electronic circuitry.
In 1937, Claude Shannon produced his master's thesis at MIT that implemented binary arithmetic using electronic relays and switches for the first time in history.

In November of 1937, George Stibitz, then working at Bell Labs, completed a relay-based computer he dubbed the "Model K" (for "**K**itchen", where he had assembled it), which calculated using binary addition.

BINARY NUMBERS

FIRST, LIST THE POWERS OF TWO FROM RIGHT TO LEFT
SECOND, IDENTIFY THE LARGEST POWER OF 2 THAT IS LESS THAN OR EQUAL TO YOUR NUMBER
THIRD, FIND THE NEXT LARGEST POWER OF 2 THAT YOU NEED TO ADD TO THE FIRST TO REACH THE SUM OF YOUR NUMBER
FOURTH, PUT A "1" IN EVERY BOX THAT IS USED AND A "0" IN EVERY BOX THAT IS NOT USED.

2x2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2	2x2	2	1		
2x2x2x2	x2x2x2x2	x2x2x2	x2x2	x2							
2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0		
612	**256**	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**		**Number In base 10**
								(highest # you can try on this worksheet is 1,023)			
									1		1
								1	1		3
						1	1	1	1		15
					1	1	1	1	1		31
				1	1	1	1	1	1		63
			1	1	1	1	1	1	1		127
		1	1	1	1	1	1	1	1		255
	1	1	1	1	1	1	1	1	1		511
1	1	1	1	1	1	1	1	1	1		1,023
								1	0		2
								1	1		3
							1	0	0		4
							1	0	1		5
							1	1	0		6
							1	1	1		7
						1	0	0	0		8
						1	0	0	1		9
						1	0	1	0		10
						1	0	1	1		11
						1	1	0	0		12
						1	1	0	1		13
						1	1	1	0		14
						1	1	1	1		15

CHOOSE A SERIES OF NUMBERS YOU ENJOY AND LIST THEM IN THE COLUMN MARKED, NUMBER IN BASE 10 AND FIND THE BINARY CODE FOR EACH
(see the series of square numbers listed on the next page)

BINARY NUMBERS

FIRST, LIST THE POWERS OF TWO FROM RIGHT TO LEFT
SECOND, IDENTIFY THE LARGEST POWER OF 2 THAT IS LESS THAN OR EQUAL TO YOUR NUMBER
THIRD, FIND THE NEXT LARGEST POWER OF 2 THAT YOU NEED TO ADD TO THE FIRST TO REACH THE SUM OF YOUR NUMBER
FOURTH, PUT A "1" IN EVERY BOX THAT IS USED AND A "0" IN EVERY BOX THAT IS NOT USED.

2x2x2x2x2x2	2x2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2	2x2	2	1	
2x2x2x2x2	x2x2x2x2x2	x2x2x2x2	x2x2x2	x2x2	x2					
2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
512	**256**	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**Number in base 10**
								(highest # you can try on this worksheet is 1,023)		

BINARY NUMBERS

FIRST, LIST THE POWERS OF TWO FROM RIGHT TO LEFT
SECOND, IDENTIFY THE LARGEST POWER OF 2 THAT IS LESS THAN OR EQUAL TO YOUR NUMBER
THIRD, FIND THE NEXT LARGEST POWER OF 2 THAT YOU NEED TO ADD TO THE FIRST TO REACH THE SUM OF YOUR NUMBER
FOURTH, PUT A "1" IN EVERY BOX THAT IS USED AND A "0" IN EVERY BOX THAT IS NOT USED.

2x2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2x2	2x2x2	2x2	2	1	
2x2x2x2	x2x2x2x2	x2x2x2	x2x2	x2						
2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
512	**256**	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**Number In base 10**
								(highest # you can try on this worksheet is 1,023)		
									1	1
							1	0	0	4
						1	0	0	1	9
					1	0	0	0	0	16
					1	1	0	0	1	25
				1	0	0	1	0	0	36
				1	1	0	0	0	1	49
			1	0	0	0	0	0	0	64
			1	0	1	0	0	0	1	81
			1	1	0	0	1	0	0	100
			1	1	1	1	0	0	1	121
		1	0	0	1	0	0	0	0	144
		1	0	1	0	1	0	0	1	169
		1	1	0	0	0	1	0	0	196
		1	1	1	0	0	0	0	1	225
	1	0	0	0	0	0	0	0	0	256
	1	0	0	1	0	0	0	0	1	289
	1	1	0	0	0	0	1	0	0	324
	1	0	1	1	0	1	0	0	1	361
	1	1	0	0	1	1	0	1	0	400