

If we want to work the binary code out quickly we can use this table. In the table you can see the binary units double each time: 1,2,4,8,16,32,64,128. There is a 1 below the binary unit that equals the decimal number.

	Binary Units	128	64	32	16	8	4	2	1
Decin Numl									1
	2							1	О

But how do you make 3? Well, the number 3 can be split into 1 and 2 and 1+2=3: So, we can mark a number 1 below 1 and below 2:

Binary Units	128	64	32	16	8	4	2	1
Units								
3							1	1

To calculate the binary number, we must see how a number can be split. Always start with the biggest number that it can be split with and then add the smaller numbers until the whole number has been calculated. Remember to put a zero in the gaps (for the numbers that are not being used).

Let's see some more examples!

	[,]				Γ _	Γ 4		Γ
Binary	128	64	32	16	8	4	2	1
Units								
1								1
2							1	0
3							1	1
4						1	0	О
5						1	0	1
6						1	1	О
7						1	1	1
8					1	0	0	О
9					1	0	0	1
10					1	0	1	0

To make 10 there is one 8 and one 2. But how can you make 20? The highest number that can go in is 16 and then 4 so the binary number is:

Binary Units	128	64	32	16	8	4	2	1
20				1	0	1	0	0

< 3

16+4=20! Easy Right?



Your Turn!

Fill in the table by creating binary numbers for the following decimal numbers:

								>
Binary	128	64	32	16	8	4	2	1
Units								
25								
64								
72								
81								
96								
100								
113								
229								

You have just created 8-bit binary codes which are also called a byte.



Congratulations!



ASCII

Next, we will learn how to use the **8-bit** code to also represent different letters. The ASCII (American Standard Code for Information Interchange) uses the eight bits to represent a letter or punctuation mark.

Here is the ASCII Alphabet table:

	А	0100 0001	Ν	0100 1110
	В	0100 0010	0	0100 1111
	\subset	0100 0110	Р	0101 0000
	D	0100 0100	Q	0101 0001
\bigvee	Ε	0100 0101	R	0101 0010
	F	0100 0110	5	0101 0011
	G	0100 0111	Т	0101 0100
	Н	0100 1000	\mathcal{U}	0101 0101
	1	0100 1001	V	0101 0110
	J	0100 1010	W	0101 0111
	Κ	0100 1011	Χ	0101 1000
	L	0100 1100	Υ	0101 1001
	Μ	0100 1101	Ζ	0101 1010
	U			



Work it out!

What is the following word?

0100 0110 0100 1111 0100 1101

0101 0000 0101 0101 01010100

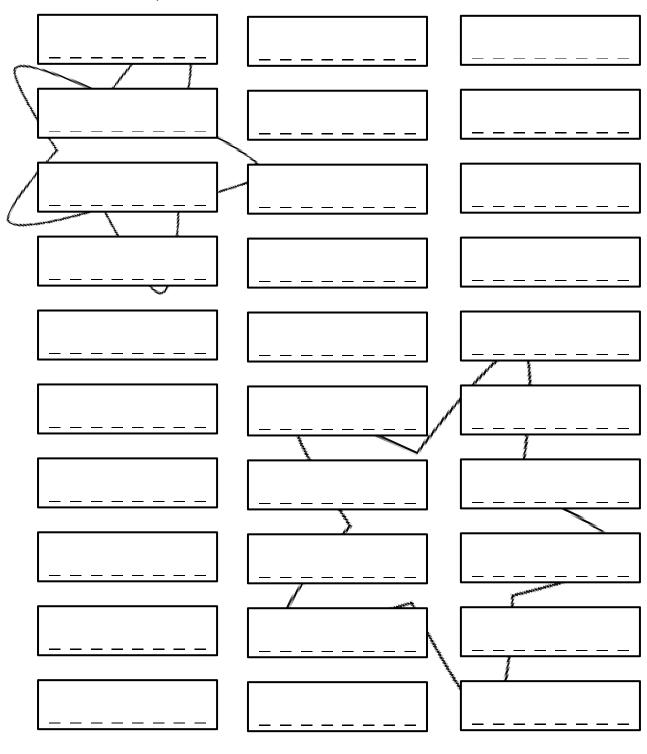
0100 0101 01010010

Write the word here:



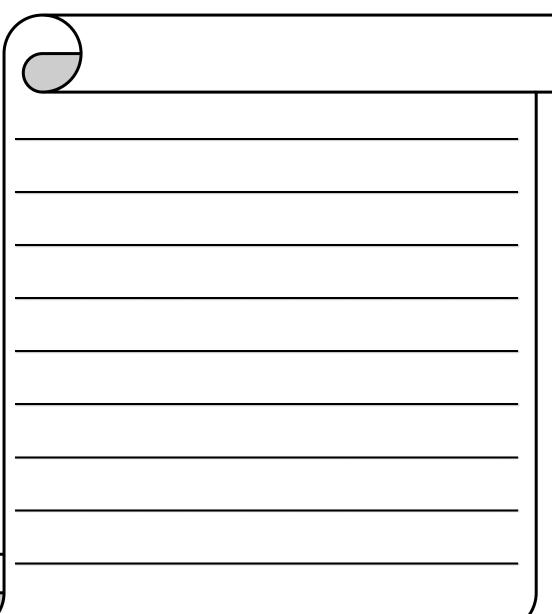
Secret Code (shhhhh!)

How about writing a secret message? Think of something top secret that you want to tell your friend, someone in your family, or even your teacher! Use the table on the previous page to check what numbers to write for each letter. Now, write out the numbers that represent each letter in the boxes below. You may not need all the boxes!





Now see if your friend, family member, or teacher can work out the message. Get them to decode your message below!



Keep Going!

Why stop here? Work out your name in binary! Use it when texting your friends. Have fun with your new skill



Simple, Easy, and Fun!

