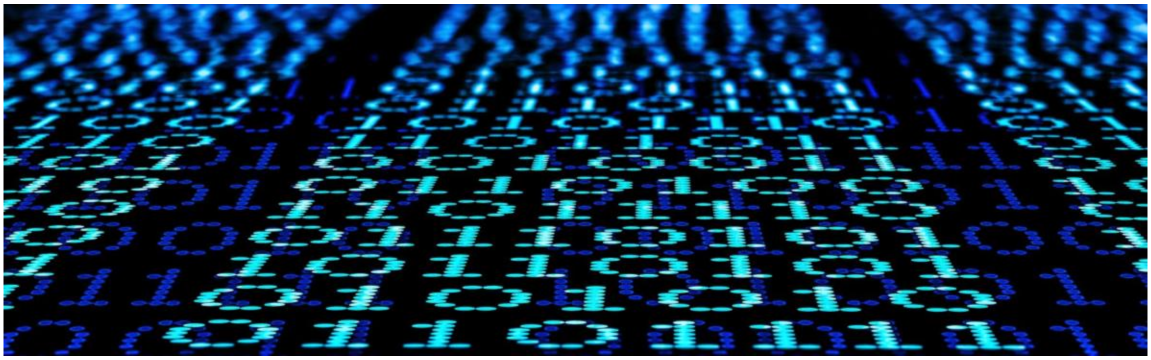


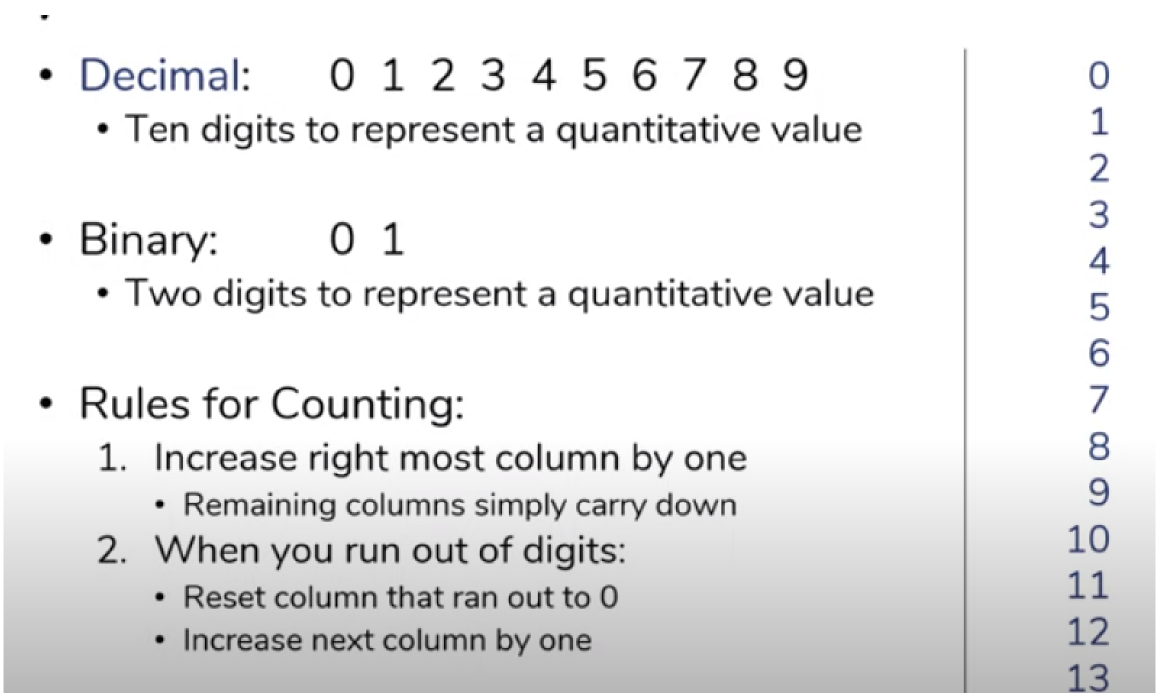
Let's take a step back and see how the binary system works, you're probably wondering why?
DO NOT WORRY! It will make perfect sense later.

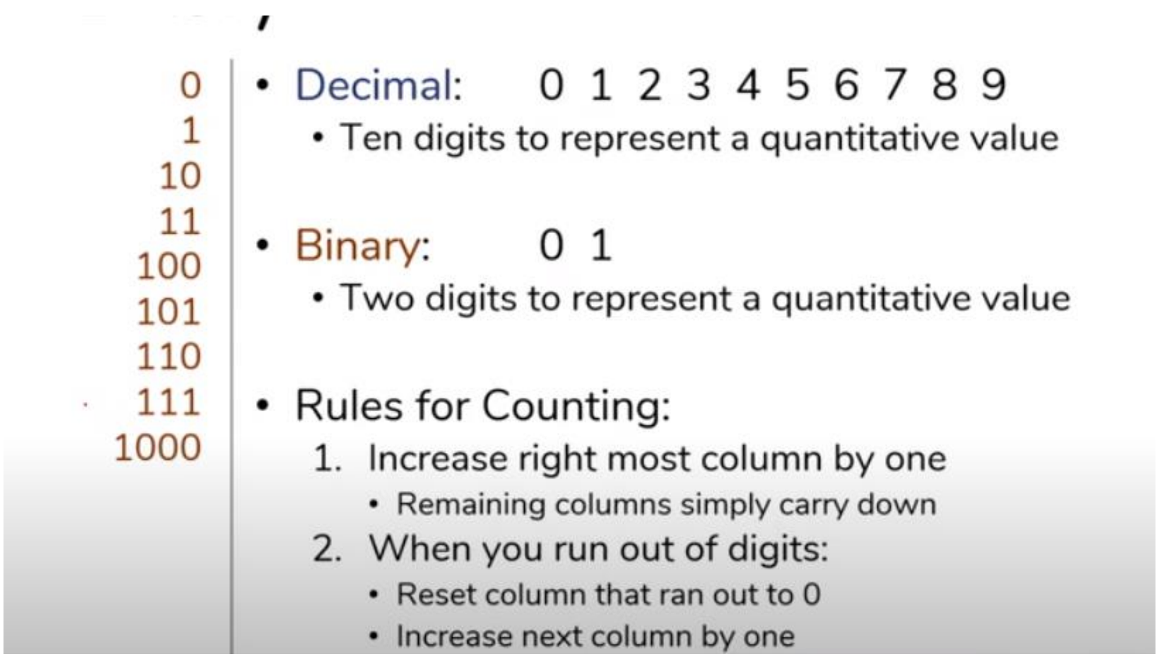
To communicate we use words, computers on the other hand uses binary, a combination of zeros and ones.
Let's see how binary works.
Digital binary numbers look like a very long sequence of zeros and ones.
We are both familiar with the concept of decimal system, If not huh??? See below
Binary also uses a system

In the decimal system we use 9 digits to represent a value 0,12,3,4,5,6,7,8,9
In binary we use only two digits to represent a value 0 and 1

What if I tell you if you understand the decimal system, Binary would be a summer breeze?

Fortunately, we use the same rules to count in binary as in decimal.
Every time we run out of digits counting starting from right to left, we reset the column that ran out to the first value which is 0 and simply increment the next column by one, thus giving us an infinite amount of room to grow.
We use the same method in binary with the only difference that we only have access to 2 digits 0 and 1.





That would give us a correlation that looks like this:

0	0	1110	14	11100	28
1	1	1111	15	11101	29
10	2	10000	16	11110	30
11	3	10001	17	11111	31
100	4	10010	18	100000	32
101	5	10011	19	100001	33
110	6	10100	20	100010	34
111	7	10101	21	100011	35
1000	8	10110	22	100100	36
1001	9	10111	23	100101	37
1010	10	11000	24	100110	38
1011	11	11001	25	100111	39
1100	12	11010	26	101000	40
1101	13	11011	27	101001	41

Now that is one way of converting from binary to decimal but there is a more effective way to do it:

If we are asked to convert form example 706208 in binary

We know that:

7 is in the 100000 place value

0 is in the 10000 place value

6 is in the 1000 place value

2 is in the 100 place value

0 is in the 10 place value

8 is in the 1 place value

Same goes for 101011 in binary

1 is in the 100000 place value

0 is in the 10000 place value

1 is in the 1000 place value

0 is in the 100 place value

1 is in the 10 place value

1 is in the 1 place value

506207		101011	
500000	5 × 100000	100000	1 × 100000
00000	0 × 10000	00000	0 × 10000
6000	6 × 1000	1000	1 × 1000
200	2 × 100	000	0 × 100
00	0 × 10	10	1 × 10
7	7 × 1	1	1 × 1

All we need to know is what each one of the place values equal in decimal and simply add them together depending of course if we have a one or a zero because as we know every number multiplied by 0 equals 0.
Now if we go back to our chart
We can easily figure out what is their value

101011 = **43**

100000	1 × 100000	(32)	=	32
00000	0 × 10000	(16)	=	0
1000	1 × 1000	(8)	=	8
000	0 × 100	(4)	=	0
10	1 × 10	(2)	=	2
1	1 × 1	(1)	=	1
				43

0	0	1110	14	11100	28
1	1	1111	15	11101	29
10	2	10000	16	11110	30
11	3	10001	17	11111	31
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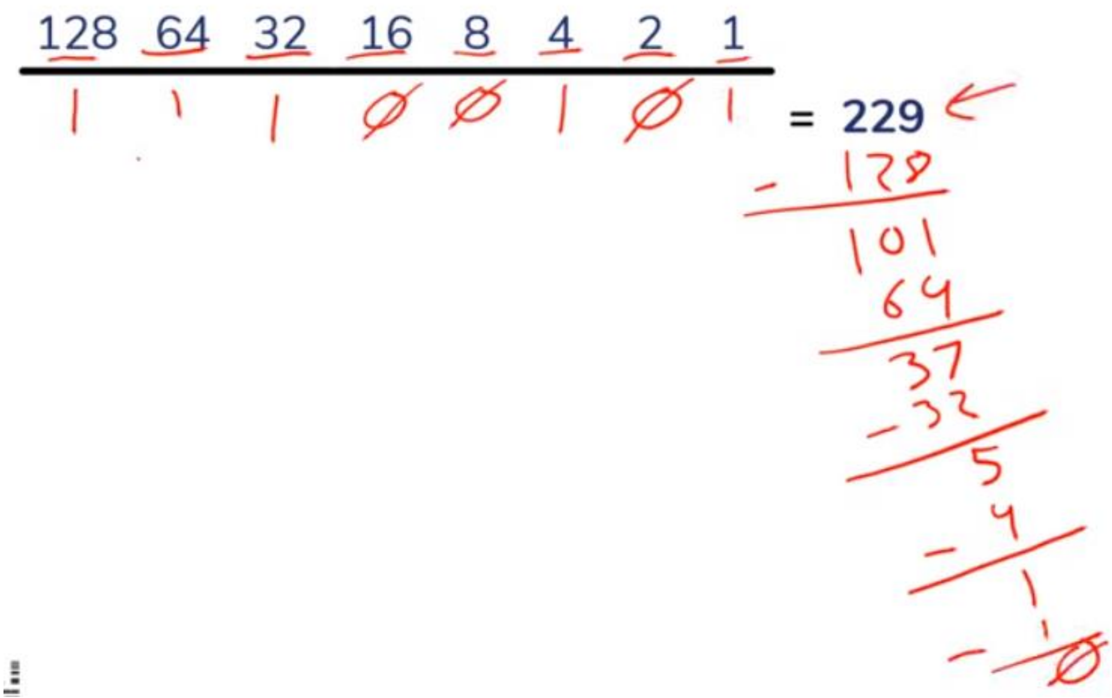
If you look closely, you will notice a pattern, to get the next value of the sequence, we simply multiply by 2
1,2,4,8,16,32,64,128.........

Now if we want to convert binary to decimal and vice versa we can use these values

128	64	32	16	8	4	2	1	
0	0	1	0	1	0	1	1	= 43
0	0	0	1	0	0	0	1	= 17
1	0	0	1	0	1	1	0	= 150
1	0	1	0	1	0	1	0	= 170
0	0	1	1	1	1	1	1	= 63
0	1	0	0	0	0	0	0	= 64
0	1	0	0	0	0	0	1	= 65
0	0	0	0	0	0	0	0	= 0
1	1	1	1	1	1	1	1	= 255

And to convert from decimal to binary we use the same method, with the only difference of subtracting instead of adding.



Now you might wonder why I had you go through the binary numeral system?
What relation exists between binary and subnetting huh?

A digit in the computing world is called a bit.

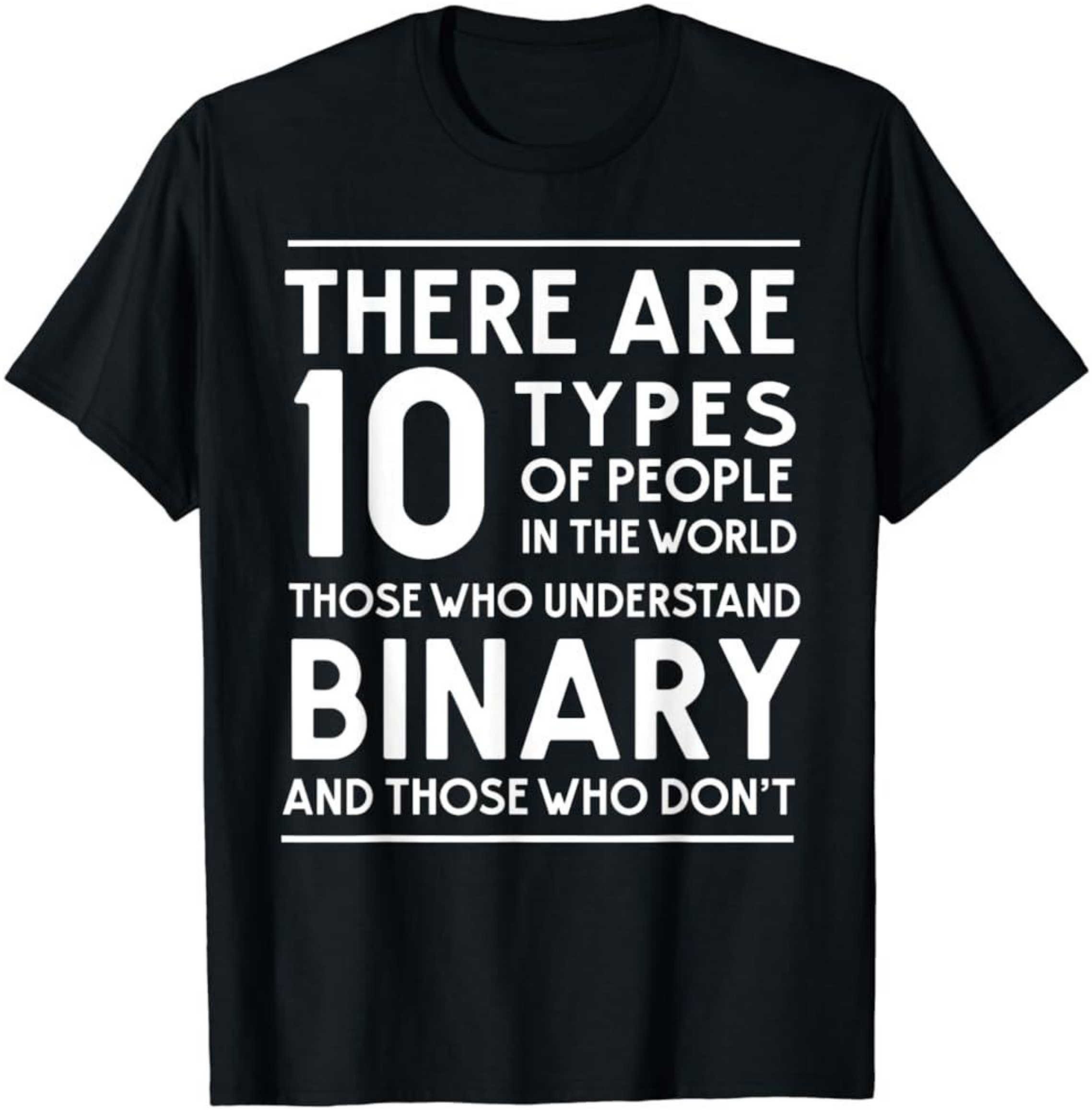
An Ipv4 address consists of 32 bits.
And the way that they are represented is by breaking those 32 bits into 4 equal parts(octets).
We can say that an Ipv4 address has 4 octets of 8 bits each.
This is why you will never encounter an IP address with the value of 256.
With **00000000 = 0** and **11111111 = 255** being the lowest and highest value.

- Every IPv4 address is 32 bits long
- Broken up in to four “octets” that are each 8 bits
  - Smallest 8 bit Binary number: 0000 0000 (**0**)
  - Largest 8 bit Binary number: 1111 1111 (**255**)

[0 – 255] . [0 – 255] . [0 – 255] . [0 – 255]

128	64	32	16	8	4	2	1		
0	0	0	0	0	0	0	0	=	**0**
1	1	1	1	1	1	1	1	=	**255**

Hopefully now you’ll be part of the community that can proudly wear this shirt!


THERE ARE
10 TYPES
OF PEOPLE
IN THE WORLD
THOSE WHO UNDERSTAND
BINARY
AND THOSE WHO DON'T