**Binary number system and examples-**

The binary number system is a numeral system that uses only two digits, 0 and 1, to represent numbers. It is also known as the base-2 number system, as each digit's value is a power of 2.

In the binary system, each digit is referred to as a "bit" (short for binary digit). The rightmost bit represents 2^0 (1), the next bit to the left represents 2^1 (2), the next bit represents 2^2 (4), and so on. The place values increase by powers of 2 as you move to the left.

**Here are some examples of binary numbers and their decimal equivalents:**

* 1010 (binary) = (1 \* 2^3) + (0 \* 2^2) + (1 \* 2^1) + (0 \* 2^0) = 8 + 0 + 2 + 0 = 10 (decimal)
* 11010 (binary) = (1 \* 2^4) + (1 \* 2^3) + (0 \* 2^2) + (1 \* 2^1) + (0 \* 2^0) = 16 + 8 + 0 + 2 + 0 = 26 (decimal)
* 11111 (binary) = (1 \* 2^4) + (1 \* 2^3) + (1 \* 2^2) + (1 \* 2^1) + (1 \* 2^0) = 16 + 8 + 4 + 2 + 1 = 31 (decimal)
* 10001 (binary) = (1 \* 2^4) + (0 \* 2^3) + (0 \* 2^2) + (0 \* 2^1) + (1 \* 2^0) = 16 + 0 + 0 + 0 + 1 = 17 (decimal)

**decimal number system**-

also known as the base-10 number system, is the most commonly used number system in everyday life. It uses ten digits from 0 to 9 to represent all numbers.

In the decimal system, each digit has a place value based on powers of 10. The rightmost digit has a place value of 10^0 (which is 1), the next digit to the left has a place value of 10^1 (which is 10), the next digit has a place value of 10^2 (which is 100), and so on. The place values increase by powers of 10 as you move to the left.

To represent a number in decimal, you use a string of digits. For example, the number 356 in decimal representation means (3 \* 10^2) + (5 \* 10^1) + (6 \* 10^0), which equals 300 + 50 + 6.

**To convert a decimal number to its binary representation, you can use the following method**:

* Start with the given decimal number.
* Divide the number by 2, and note down the remainder.
* Write down the remainder as the least significant bit (LSB) of the binary number.
* Divide the quotient obtained in step 2 by 2 again and note down the remainder.
* Write down this remainder as the next bit of the binary number, to the left of the previous bit.
* Repeat steps 4 and 5, dividing the quotient by 2 and noting down the remainders, until the quotient becomes 0.

The binary number is obtained by arranging the remainders obtained in reverse order, starting from the least significant bit.