

Binary addition is the process of adding two binary numbers. It is similar to decimal addition, but instead of adding digits in base 10, we add digits in base 2.

The rules of binary addition are as follows:

- $0 + 0 = 0$
- $0 + 1 = 1$
- $1 + 0 = 1$
- $1 + 1 = 10$
- $1 + 1 + 1 = 11$

The carry bit is used to represent the overflow when adding two binary numbers. If the sum of two binary digits is greater than or equal to 10, then the carry bit is set to 1. The carry bit is then added to the next column of the addition.

Here is an example of binary addition:

$$1 + 1 = 10$$

The sum of 1 and 1 is greater than or equal to 10, so the carry bit is set to 1. The carry bit is then added to the next column of the addition.

$$10 + 1 = 11$$

The sum of 10 and 1 is 11, so the result of the binary addition is 11.

Binary addition is used in all computers and digital devices. It is a fundamental operation in computer arithmetic.

Here is a table showing the binary addition table:

| A | B | Sum | Carry |
|------------|------------|-----|-------|
| 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1+1(carry) | 1 | 1 |
| 1+1(carry) | 1 | 1 | 1 |

As you can see, the binary addition table is similar to the decimal addition table. However, the binary addition table only has four combinations, since the base of the binary number system is 2.

Binary addition is a relatively simple operation, but it is essential for the operation of computers and digital devices.

Watch this video before moving forward:

<https://www.youtube.com/watch?v=4qH4unVtJkE>