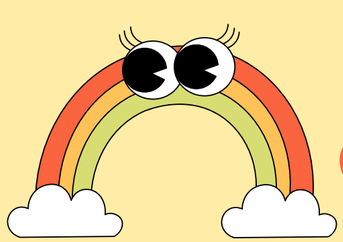
MATHEMATICS 1

Decimal Number System



GROUP 5

GROUP MEMBER

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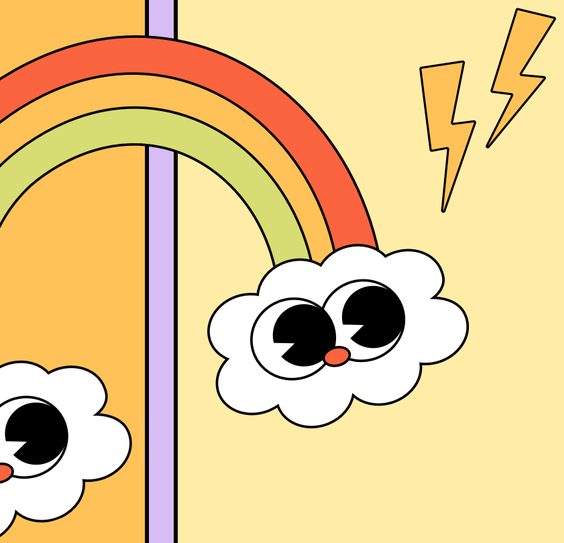
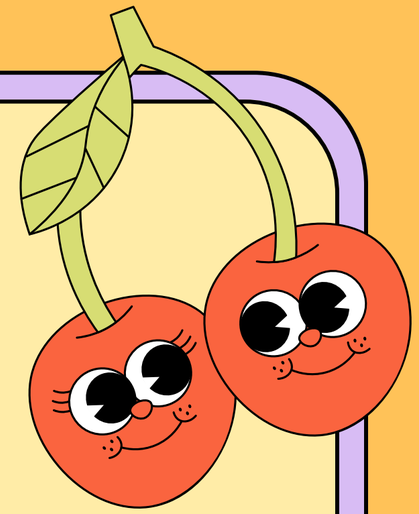
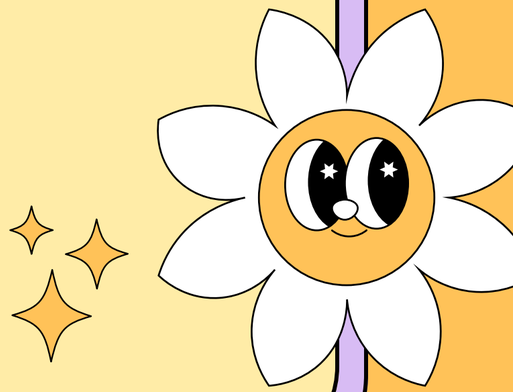
DEFINITION OF NUMBER SYSTEM



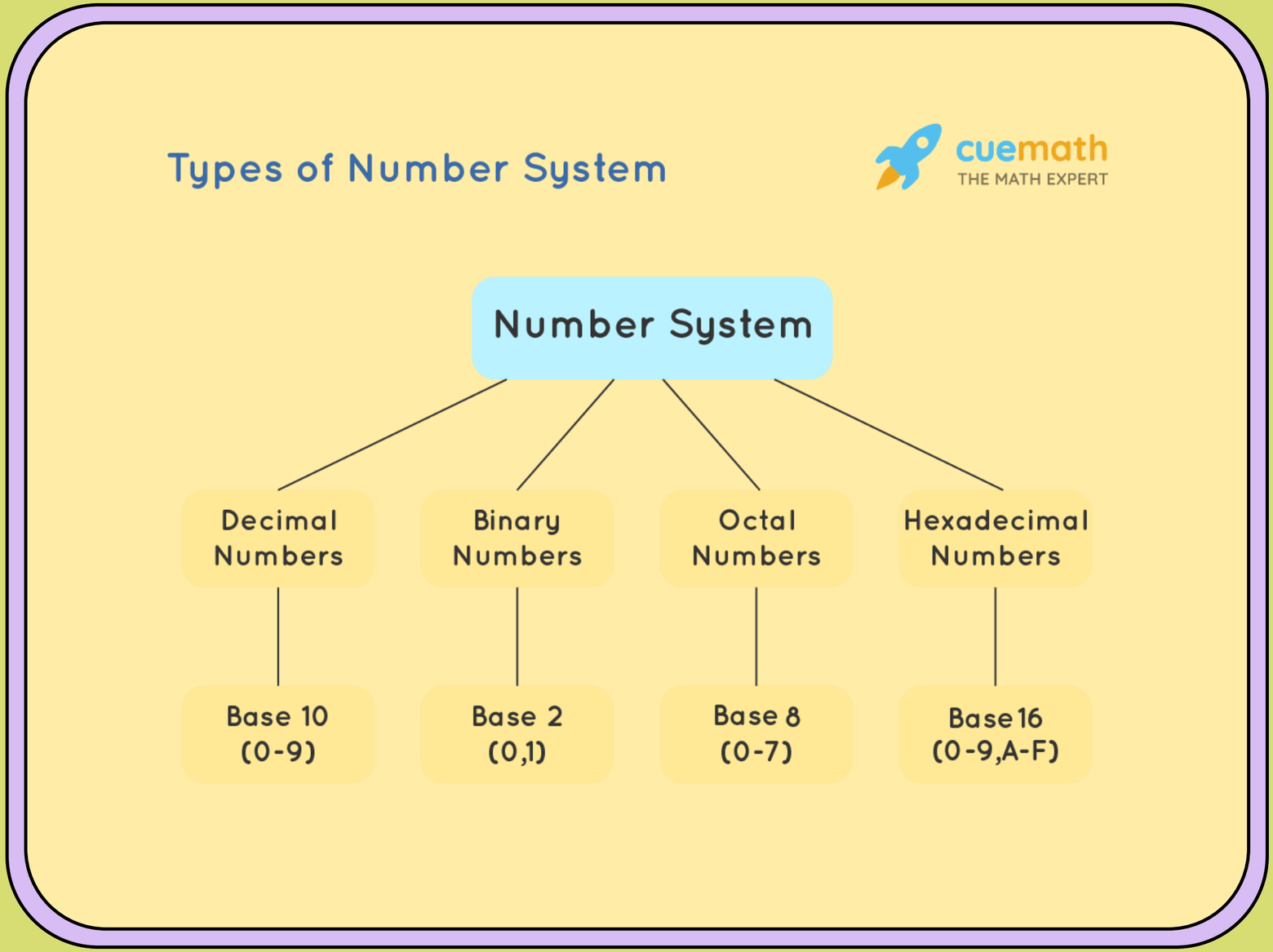




NUMBER SYSTEM

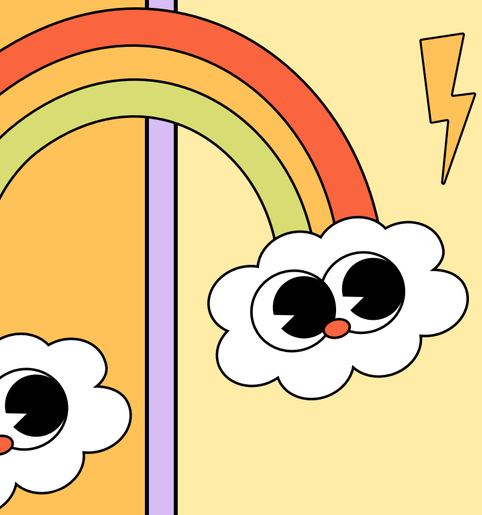
Number systems are systems in mathematics that are used to express numbers in various forms and are understood by computers. A number is a mathematical value used for counting and measuring objects, and for performing arithmetic calculations.

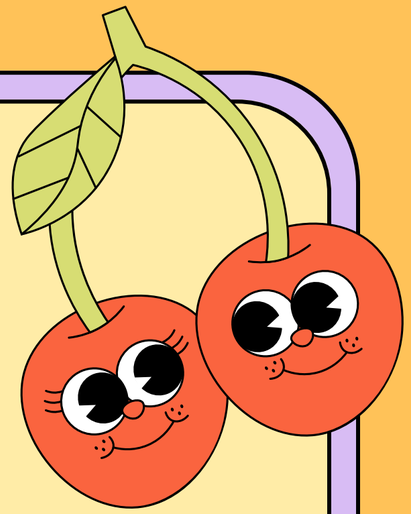
Numbers have various categories like natural numbers, whole numbers, rational and irrational numbers, and so on. Similarly, there are various types of number systems that have different properties, like the binary number system, the octal number system, the decimal number system, and the hexadecimal number system.

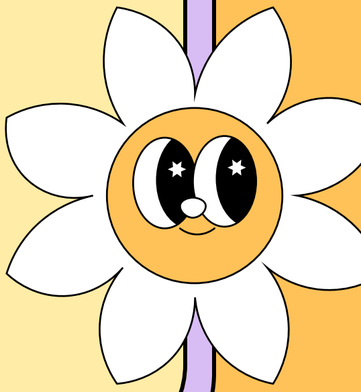


Types of Number System

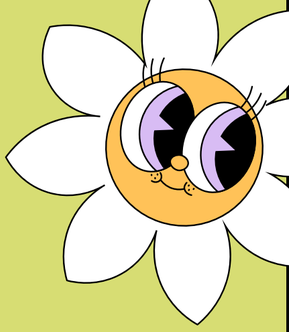
DEFINITION OF DECIMAL NUMBER SYSTEM (BASE 10)





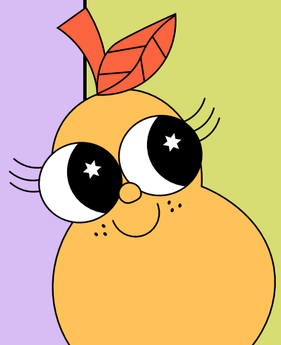


DECIMAL NUMBER SYSTEM (BASE 10)



Decimal number system using 10 kinds of symbols namely: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The decimal number system can be a decimal integer and can also be a decimal fraction.

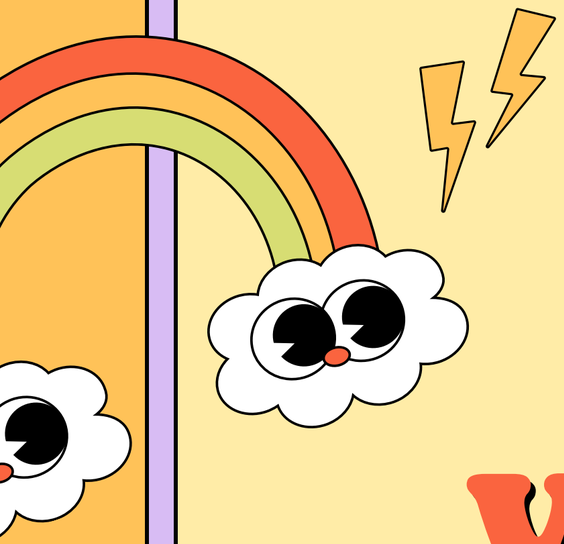
- $325_{10} = 3 \times 10^2 + 2 \times 10^1 + 5 \times 10^0$
- $0{,}61_{10} = 0 \times 10^0 + 6 \times 10^{-1} + 1 \times 10^{-2}$
  $= 6 \times 10^{-1} + 1 \times 10^{-2}$
- $9407{,}108_{10} = 9 \times 10^3 + 4 \times 10^2 + 7 \times 10^0 +$
  $1 \times 10^{-1} + 8 \times 10^{-3}.$
- 321_{10} =.....?

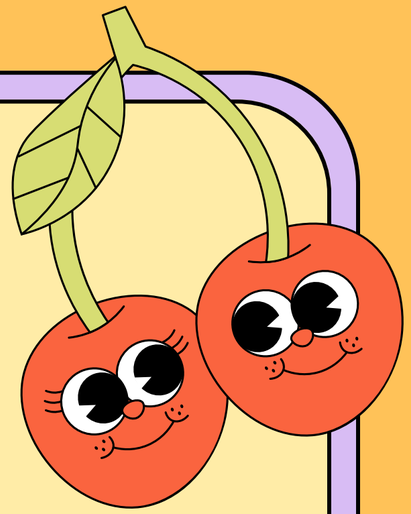
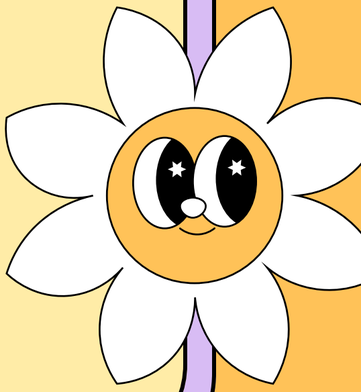


The table of number system

DECIMAL	BINER	OCTAL	HEXADECIMAL
0	0000	0	0
1	0001	1	1
2	0010	2	2
3	0011	3	3
4	0100	4	4
5	0101	5	5
6	0110	6	6
7	0111	7	7
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

DECIMAL CONVERSION TO VARIOUS TYPES OF NUMBER SYSTEM



CONVERTION DECIMAL TO BINARY

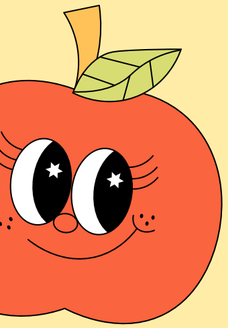
The first way, divide the decimal number by 2 by declaring the rest. Then the quotient is subdivided, write the rest, and this process is continued until we obtain a quotient of less than 2. The writing of binary numbers starts from the last quotient, then the rest of the last division, and continues until the rest of the divisions of the first time.

Example:

Convert 102_{10} into the binary number system.

$$
\begin{aligned}
102 \div 2 &= 51 \text{ sisa } 0 \\
51 \div 2 &= 25 \text{ sisa } 1 \\
25 \div 2 &= 12 \text{ sisa } 1 \\
12 \div 2 &= 6 \text{ sisa } 0 \\
6 \div 2 &= 3 \text{ sisa } 0 \\
3 \div 2 &= 1 \text{ sisa } 1
\end{aligned}
$$

So, the numbers 102_{10} when expressed in the binary number system becomes $\boxed{1100110_2}$



CONVERTION DECIMAL TO OCTAL

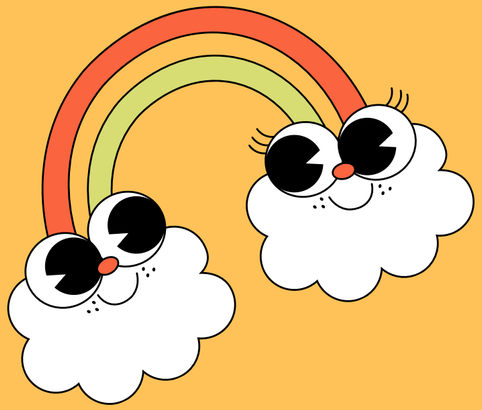
In this conversion, divide the decimal number by 8 by declaring the rest. Then the quotient is subdivided, write the rest, and this process is continued until we obtain a quotient of less than 8. The writing of the octal number starts from the last quotient, then the rest of the last division, and continues until the rest of the division of the first time. As shown below:

Example:

Convert 124_{10} into the octal number system.

$$124 \div 8 = 15 \text{ sisa } 4$$
$$15 \div 8 = 1 \text{ sisa } 7$$

So, the numbers 124_{10} when expressed in the octal number system becomes $\boxed{174_8}$



CONVERTION DECIMAL TO HEXADECIMAL

Number conversion by dividing a decimal number by 16 by stating the rest. Then the quotient is subdivided, write the rest, and this process is continued until we obtain a quotient of less than 16. The writing of the hexadecimal number starts from the last quotient, then the rest of the last division, and continues until the rest of the first division. If the remaining quotient is more than 9, then convert it by expressing it as a letter :

- 10 = A
- 11 = B
- 12 = C
- 13 = D
- 14 = E
- 15 = F

As shown below:

Example:

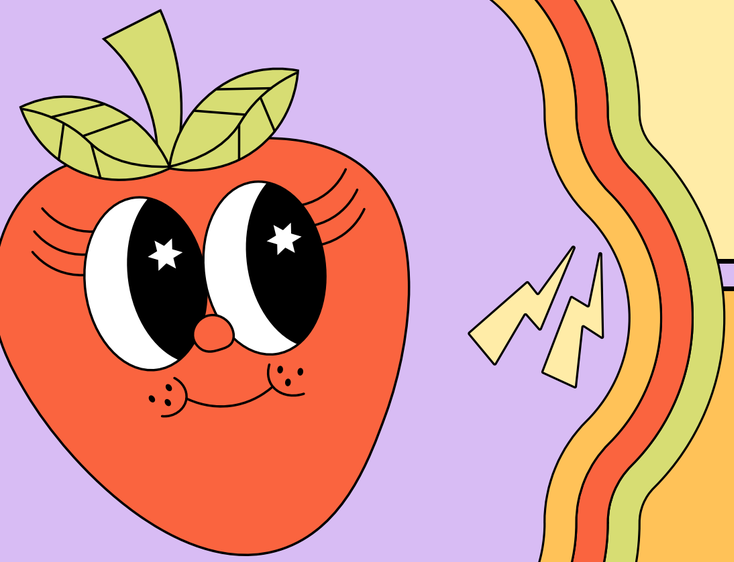
Convert 891_{10} into the hexadecimal number system.

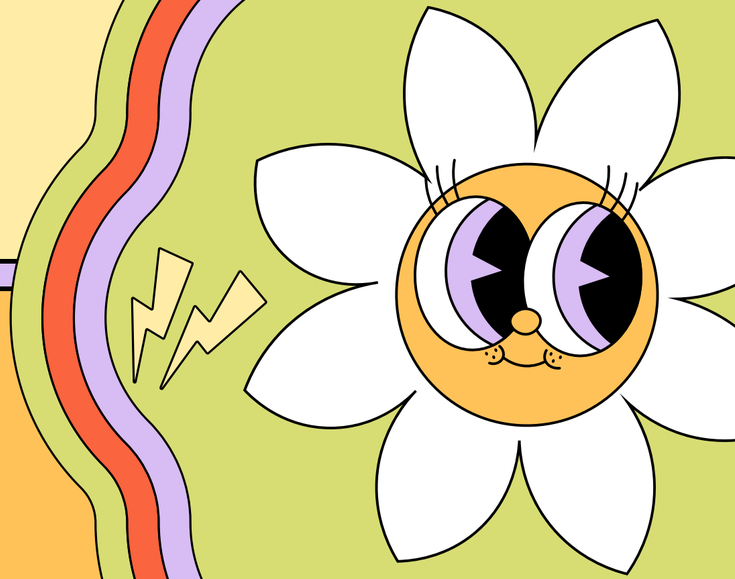
$$891 \div 16 = 55 \text{ sisa } 11$$
$$55 \div 16 = 3 \text{ sisa } 7$$

So, the numbers 891_{10} when expressed in the hexadecimal number system becomes $\boxed{37B_{16}}$

Thank You

ANY QUESTION?





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