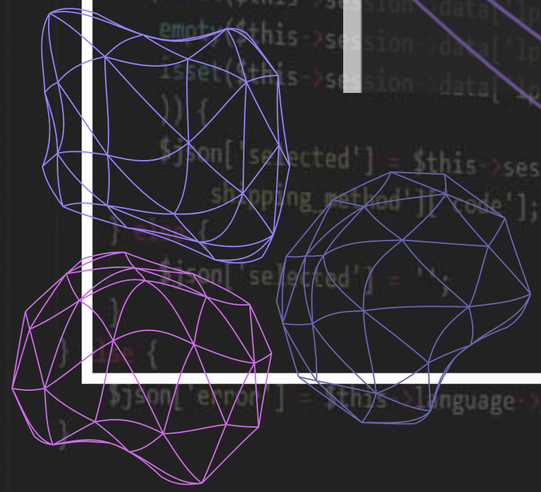
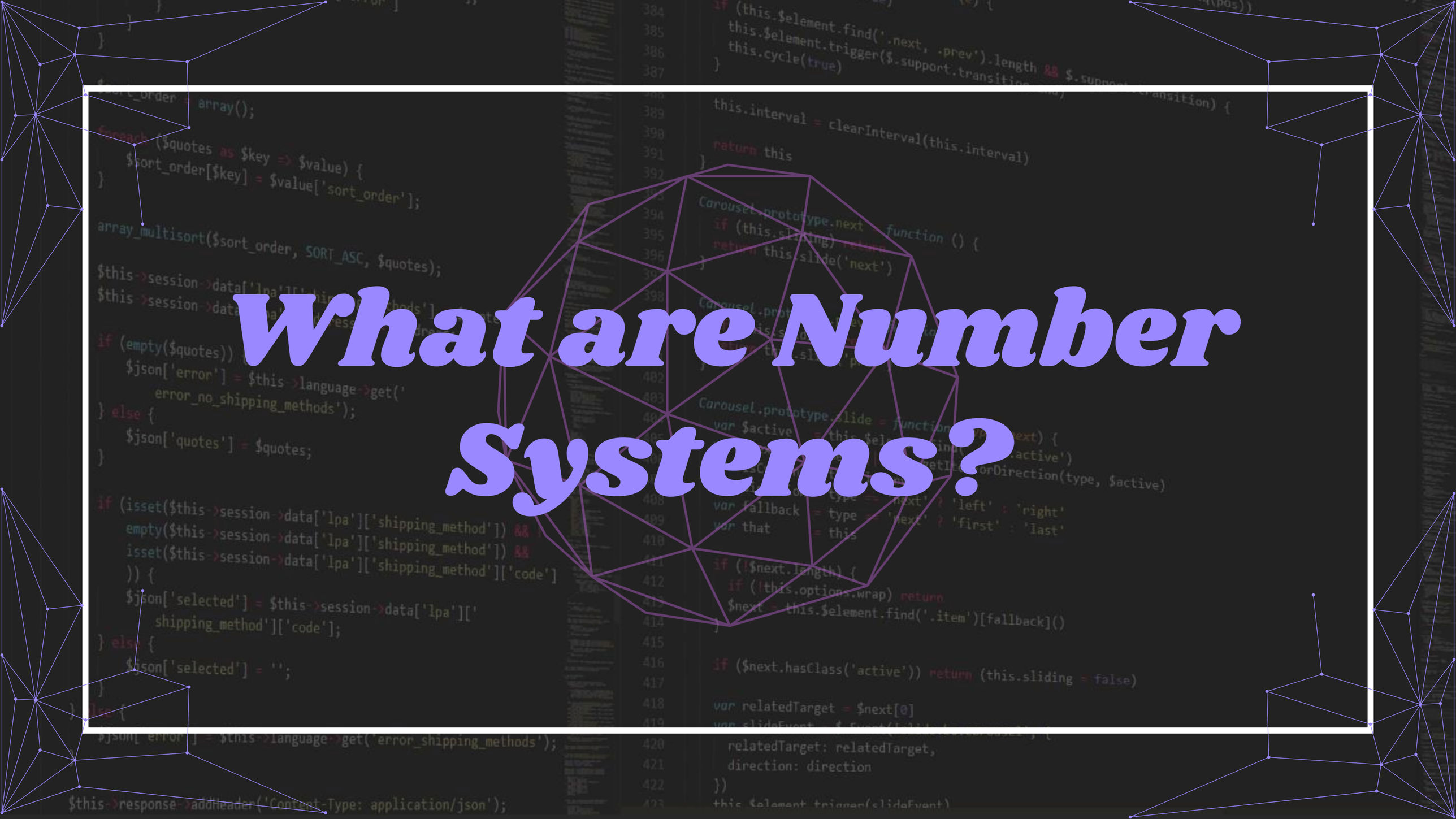
Andrea Jane C. Lato

PORTFOLIO #3




What are Number Systems?

Number System

Since "any notation for the representation of numerals or numbers" is what is meant to be understood as a "number system," we naturally employ the decimal (base 10) system, which uses the numbers 0 through 9 to represent all other numbers.

The range of values that each digit can take on and the interpretation rule that establishes the relationship between the numerical values of the successive digits and their sequence form a number system.

Traditional number systems are weighted, positional, nonredundant number systems. The number system aids in determining the degree to which an entity must be limited. These provide us with a broad understanding of the mathematical procedures pertaining to the specified numbers. This facilitates the use of mathematical operations to calculate numbers.

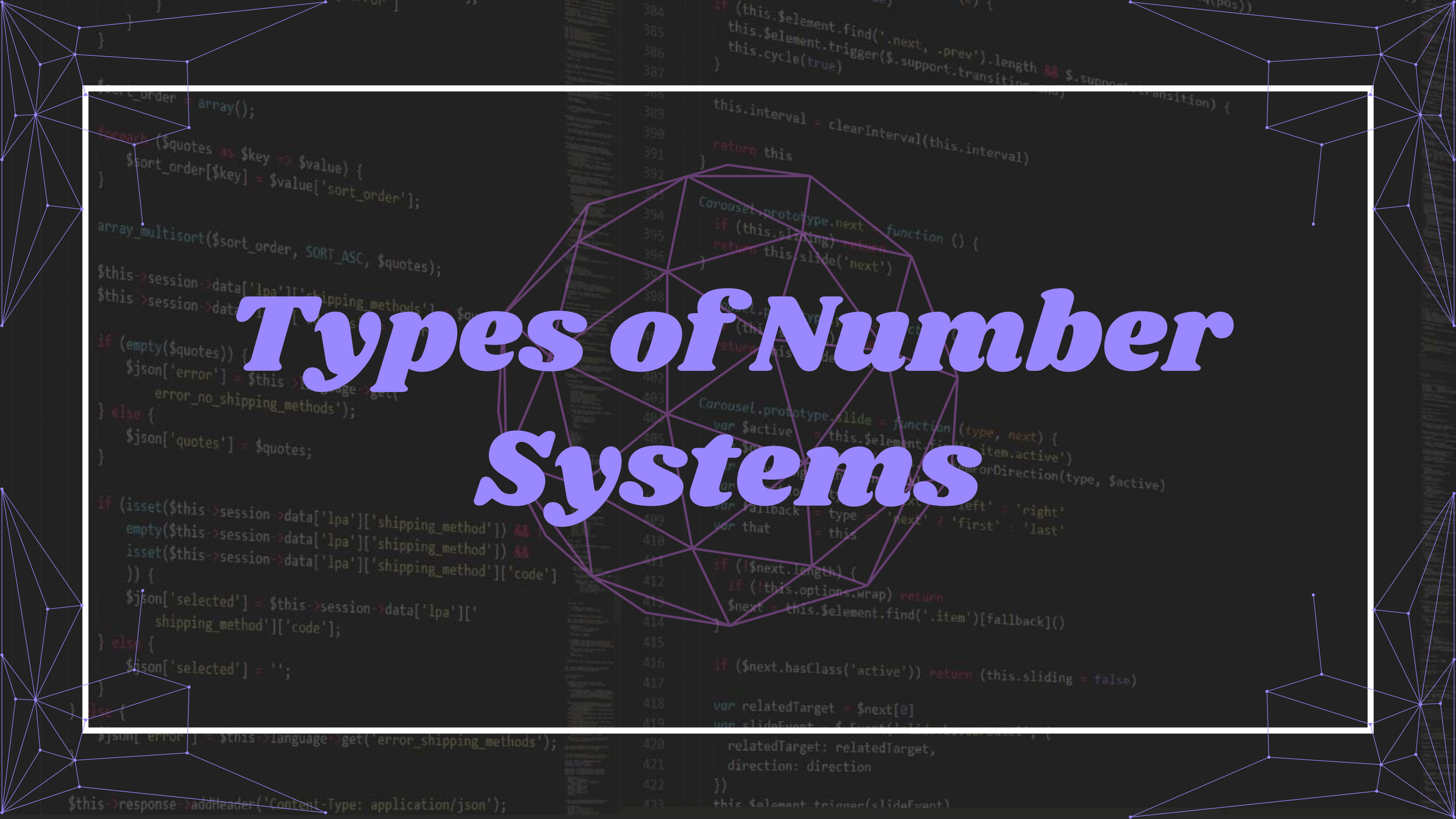
Importance of Number Systems

Digital devices especially computers use binary number system instead of decimal, using two digits i.e. 0 and 1 based on the fundamental concept of the decimal number system. Various other number systems also used this fundamental concept of decimal number system i.e. quaternary, senary, octal, duodecimal, quadrodecimal, hexadecimal and vigesimal number system using four, six, eight, twelve, fourteen, sixteen, and twenty digits respectively. The awareness and concept of various number systems, their number representation, arithmetic operations, compliments and the inter conversion of numbers belong different number system is essential for understanding of digital aspects.

To program digital devices successfully, one must also comprehend different number systems and how to convert between them. It takes a lot of time and skill to comprehend all of different number systems, especially the interconversion of numbers. This study examines, in tabular style, the notions of the most widely used number systems, their representation, arithmetic, complements, and interconversion. It will make it simple to comprehend and practice various number systems so that you can learn them by heart. Binary, quaternary, senary, octal, decimal, duodecimal, quadrodecimal, hexadecimal, and vigecimal are a few of these number systems.

Analysis/Reaction

ll find studying number systems very interesting. As a child, I only really knew about the basic 1,2 and 3's which I have learned is called base 10 or decimal. Now I understand how fundamentally important binary is for the computer, how other numbers, such as hexadecimal, support technology, and so on for each. Now as an IT student I should focuse more on learning about the different number systems that could help.


Types of Number Systems

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Types of Number Systems

Binary

The binary number system uses only two digits: 0 and 1. The numbers in this system have a base of 2. Digits 0 and 1 are called bits and 8 bits together make a byte. The data in computers is stored in terms of bits and bytes. The binary number system does not deal with other numbers such as 2,3,4,5 and so on.

Example: 100012, 1111012, 10101012 are some examples of numbers in the binary number system.

Types of Number Systems

Decimal

The decimal number system uses ten digits: 0,1,2,3,4,5,6,7,8 and 9 with the base number as 10. The decimal number system is the system that we generally use to represent numbers in real life. If any number is represented without a base, it means that its base is 10.

Example: 72310, 3210, and 425710 are some examples of numbers in the decimal number system.

Types of Number Systems

Octal

The octal number system uses eight digits: 0,1,2,3,4,5,6 and 7 with the base of 8. The advantage of this system is that it has lesser digits when compared to several other systems, hence, there would be fewer computational errors. Digits like 8 and 9 are not included in the octal number system. Just like the binary, the octal number system is used in minicomputers but with digits from 0 to 7.

Example: 358, 238, and 1418 are some examples of numbers in the octal number system.

Types of Number Systems

Hexadecimal

The hexadecimal number system uses sixteen digits/alphabets: 0,1,2,3,4,5,6,7,8,9 and A,B,C,D,E,F with the base number as 16. Here, A-F of the hexadecimal system means the numbers 10-15 of the decimal number system respectively. This system is used in computers to reduce the large-sized strings of the binary system.

Example: 7B316, 6F16, and 4B2A16 are some examples of numbers in the hexadecimal number system.

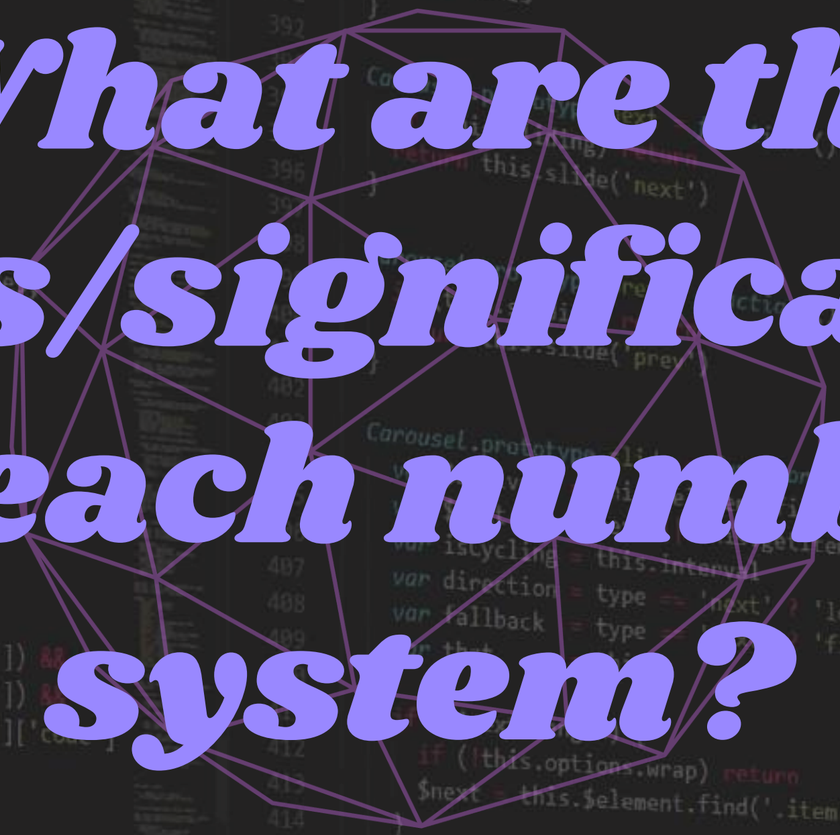
Conversion of Number Systems

Number system formulas can be used to convert a number between different number systems. It is possible to convert binary numbers to octal numbers and vice versa, as well as octal numbers to decimal numbers and vice versa, and so on.

Analysis/Reaction

I was able to have a different perspective on how we react to numbers in different contexts by studying about alternative number systems. Sincerely, I have only worked with the decimal system; nonetheless, understanding binary and its applications in computing has been quite beneficial. In addition, there are the octal and hexadecimal systems and their roles in a range of digital technology programming and applications. It's clear that each has a unique purpose and adds to our constant reliance on technology.

What are the uses/significance of each number system?



With the advancement: of digital systems and electronic technology, the need of a number system which could be defined on the basis of the two symbols was felt and thus the binary number system came into being.

Several binary codes that utilize a series of binary digits to represent decimal digits have also been explained. This is significant since the majority of numerical data produced by humans is expressed as decimal values.

Importance of Number Systems

- It helps us keep count of things around us.
- Enables unique/accurate representation of several types of numbers.
- Used for computation in the banking sector.
- Helps us in encrypting data, avoiding hacking and misuse of data.
- Allows easy conversion of numbers for technical purposes.
- It should be noted that every fiber of data gets stored in the computer as a number.

Uses of each Number System

- ***Binary***

represents data and instructions using 0s and 1s, reflecting the on-off nature of electronic circuits.

- ***Decimal***

often used for user interfaces and applications where human-readable numbers are required, such as in calculations and displays.

- ***Octal***

used to simplify binary data representation by grouping binary digits into sets of three, making it easier to read and manage in certain contexts.

- ***Hexadecimal***

system is used in computers to reduce the large-sized strings of the binary system.

Analysis/Reaction

I have learned more clearly how the several number systems can be used practically. Because the decimal system is so simple and obvious, it is applied very usefully in daily work and computations involving money. Binary, of course, is at the center of computing because it represents the on-off signals that a digital machine works. Octal represents another form in which compact binary data could be useful in programming situations where the language depnds on it. Hexadecimal actually simplifies complicated binary coding and memory addressing in terms of location. It is pretty interesting to learn about he differences between the other types of number systems.

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