

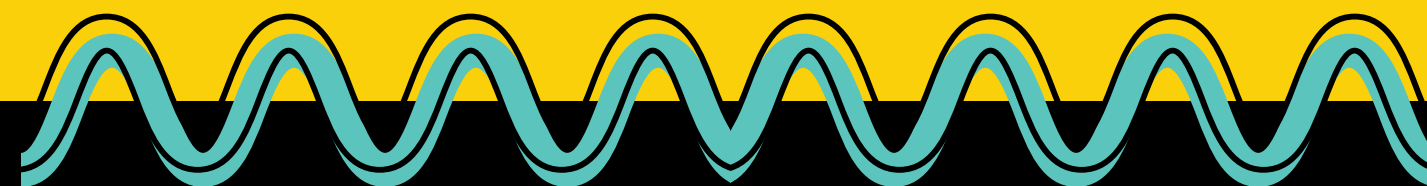
PORTFOLIO 3:  
NUMBER  
SYSTEM

DUSTIN JESSE BALANSAG

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NUMBER SYSTEM



# NUMBER SYSTEM



**Robert (2022) defines numeral system (or system of numeration) as a writing system for expressing numbers. It is the mathematical notation for consistently representing numbers in a set using digits or other symbols. This system, in theory, allows a usable set of numbers to be represented where it can assign a unique representation to each integer.**

**Additionally, Weibull (2004) states that Number System is a way for humans to represent numbers. With this system, humans can represent numbers for real life applications, most especially technology and computers with the number system being prevalent in this area. With the use of computers, it is possible to perform calculations that is beyond the capabilities of an average person, hence, with the help of programmers and numbers in base 8 and 16, computers are being used with the help of the number system.**

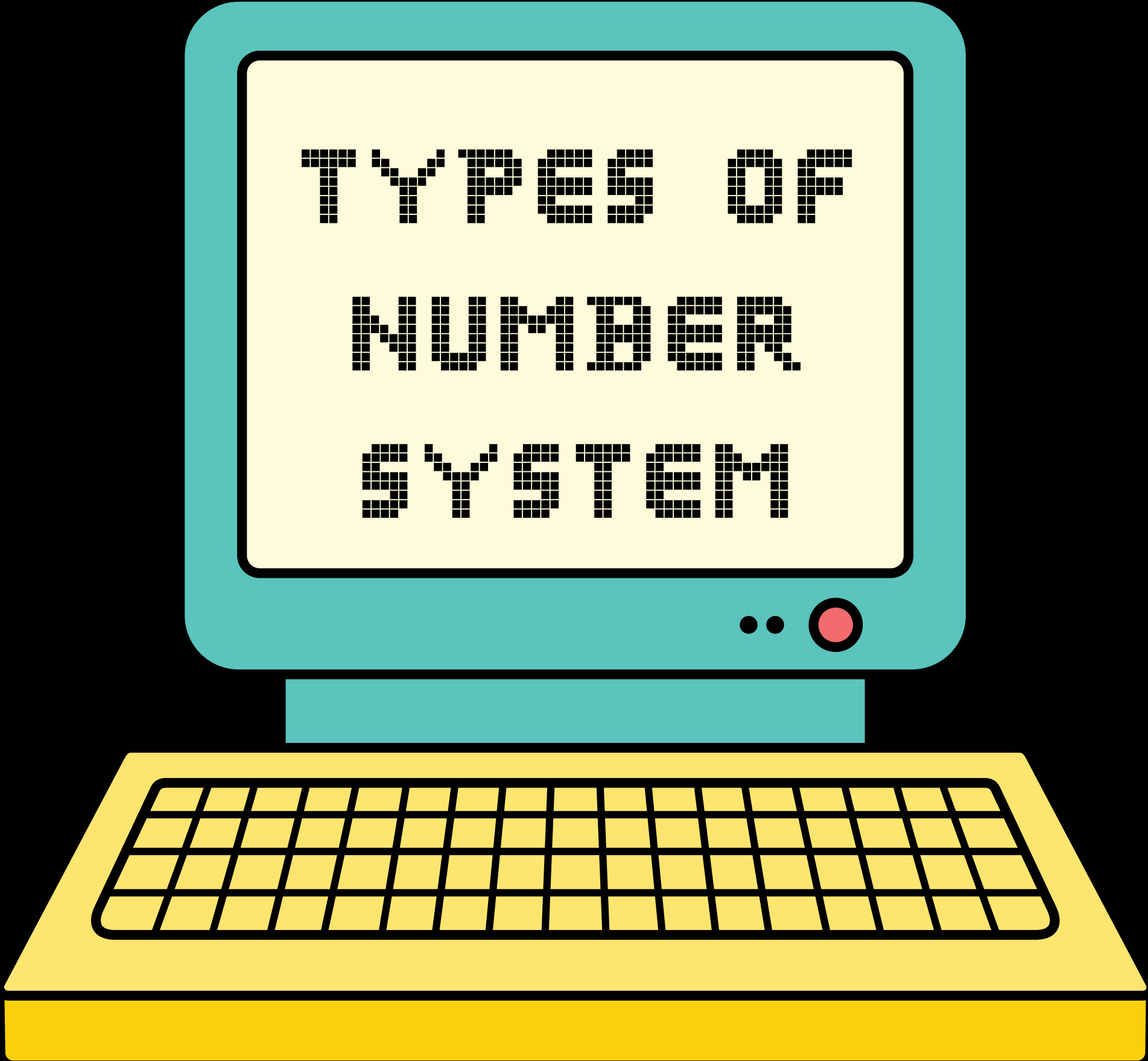
# NUMBER SYSTEM

**Number system is a set of symbols or numeric that is used to represent different quantities. In the context of computer science, this is an essential aspect as the way digital computers are designed and organized depends on number systems as any type of data, whether they are numbers, alphabets, images, or sounds, they are represented by 2 digits, 1 and 0, hence, number system plays a crucial role in digital computers. (Rwanda Education Board, 2020)**

# NUMBER SYSTEM

**Additionally, Sharma (2020) states that a number system defines how a number can be represented using distinct symbols. In computer ideology, it is regarded as the method or system of numbering and representing of digits in the computer's 'inner' system, or it is a technique used in representing numbers in the architecture of a computer system.**

**Deka (1978) states that in a computer system, there are 2 digits used for representation, 1 and 0, with them representing 'on' and 'off' respectively, with 1 representing '5V' and 0 representing '0V.' With the usage of 1 and 0, a mathematical system known as binary number system exists that is used to represent information and its manipulation in a computer.**



# TYPES OF NUMBER SYSTEM

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# TYPES OF NUMBER SYSTEM

**Latif et al. (2011) describes 4 types of number system that is used in a computer, the basic one which is decimal number system, the binary the number system which is the basic number system for the computer system itself, the octal number system, and lastly, the hexadecimal number system which are all used in the field of computer studies, depending on your needs or preferences.**

# DECIMAL AND BINARY

The decimal number system consists of 10 digits, hence, decimal is denoted as "base 10". Decimal consists of the numbers 0,1,2,3,4,5,6,7,8, and 9 with the zero representing the absence of any of the 9 numbers, or from time to time, regarded as a numeral or a digit of its own. Any number, regardless of how large it is, can be expressed using the ten digits of decimal using "place holder" or "positional value" principle which identifies whether that digit belongs to hundred, thousand, million, and many more. (Dutta, 2015)

Feaster et al. (2012) describes the binary system as the basic fundamental topic to a lot of areas. Proficiency in this topic is a requisite skill in studying computer architecture, data storage, networking, and a myriad of other topics. Binary consists of 2 main numbers, 1 and 0. These number represent "on" and "off" respectively which is its main use in computer studies and architecture. With the right utility of these, the binary can be used to store, input, and output information in the computer, and so many more usage that wouldn't have been possible without it.

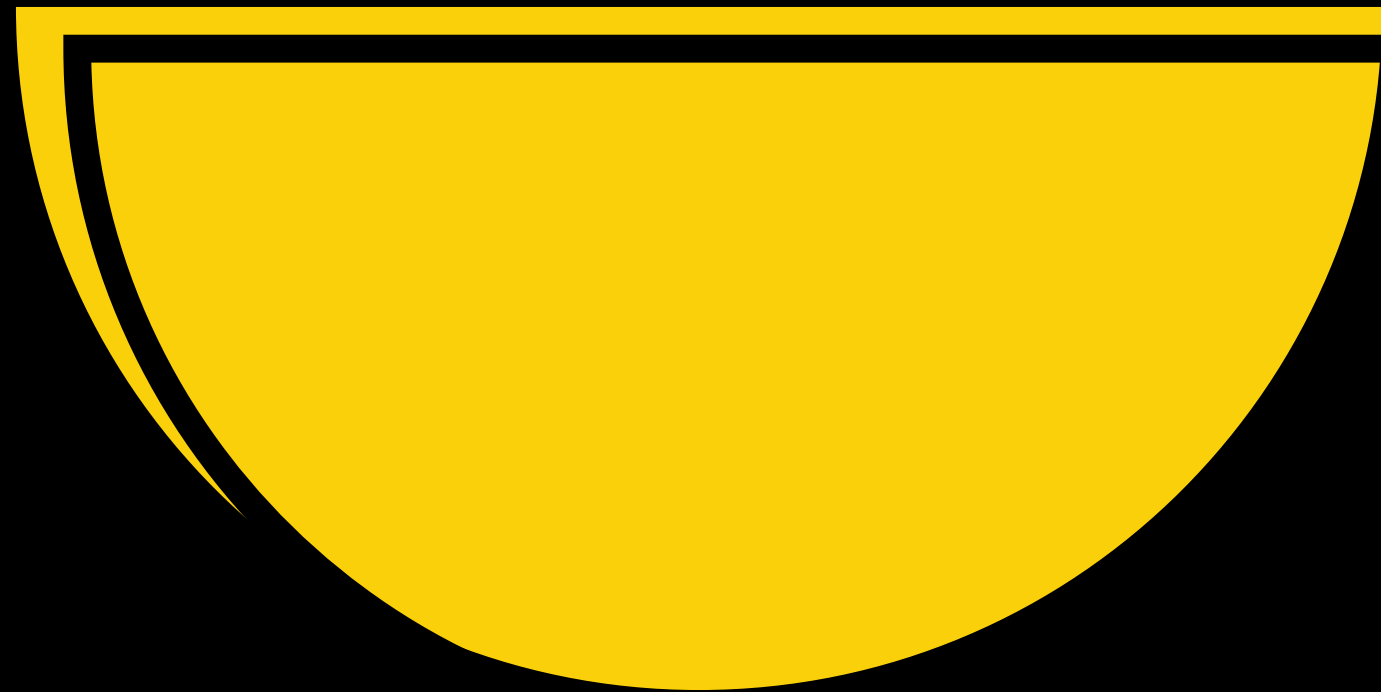


# OCTAL AND HEXADECIMAL

The Hexadecimal Number System, which has a base of 16, makes it a little easier when working with data due to the amount it can hold and read, hence, it is more preferable over the Octal Number System. This number system consists of 16 decimals with it having added 8 digits to what Octal has, namely, 8, 9, A, B, C, D, E, and F with the letters representing the numbers 10, 11, 12, 13, 14, and 15 respectively. Like Octal, the numbers in Hexadecimal also has an assigned Binary numbers, hence, conversion is also immediate. though more reliable and much more capable in the current time than Octal. (Peace, 1989).

The Octal Number System is a number system with the base 8 representing the first 8 numbers in the decimal, 0,1,2,3,4,5,6, and 7. Each of the value has a pre-assigned binary value to them, hence, conversion from Octal Number System to Binary is immediate with only needing to convert each number to its Binary value. Today, however, this number system is now rarely used due to the introduction of the Hexadecimal Number System, but it is still useful to be knowledgeable and familiar with this number system. (Donzellini, 2019)

# USES OF THE NUMERAR SYSTEMS



# USES OF THE NUMBER SYSTEMS

**Sarton (1950) states that without some system of numeration, exact counting would be restricted to relatively small collections, or else it would've become very difficult or even impossible as an endless series of number words and number signs would be required to represent numbers.**

# DECIMAL AND BINARY

**The Decimal Number System is used to represent numbers in different value, no matter how large it is. The first 10 numbers, 0 to 9, are used to represent larger and the process continues until all possible 2 digit numbers are exhausted (99) and then the 3 digit numbers continues, and the process continues on and on. (Maini, 2007)**

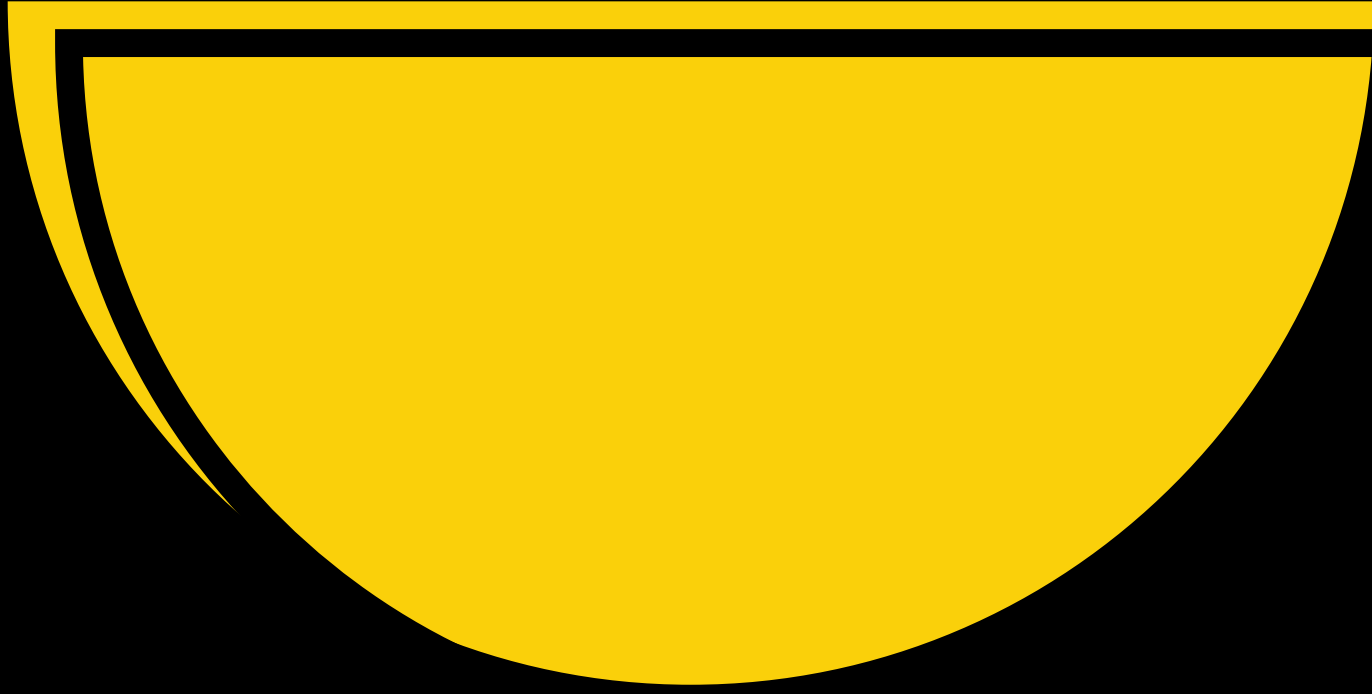
**The Binary System has a lot of utility for the field of computer studies. This system contains 2 values that is possible to represent, so any two-state electronic device may be used to represent a binary digit. This system allows the storage of information, as well as input and output with the 2 digits the binary system has. Information may be represented "dynamically" by pulses which only exist temporarily, or "statically" by d.c coupled flip-flop circuits which retains the information until they are purposely reset to a standard condition. (Williams, 1948)**

# OCTAL AND HEXADECIMAL

**Because the Binary System requires so many bits to represent relatively small numbers compared to Decimal System, they created the Octal System which allows human engineers, technicians, and programmers to "speak" the language of the digital world in 3 bits which is the Binary system. This system is set in place in order to make conversion to binary much more easier and understandable for those who are working with it. (Brewster, 2009)**

**The Hexadecimal Number System consists of 4 bits to represent each basic Hexadecimal Number, meaning, while it is the same with the Octal Number System, it can hold more bits, meaning, it can process more information than Octal, making it more efficient and more useful than Octal, most especially with the standard of quality in today's technology. (Natarjan, 2020)**

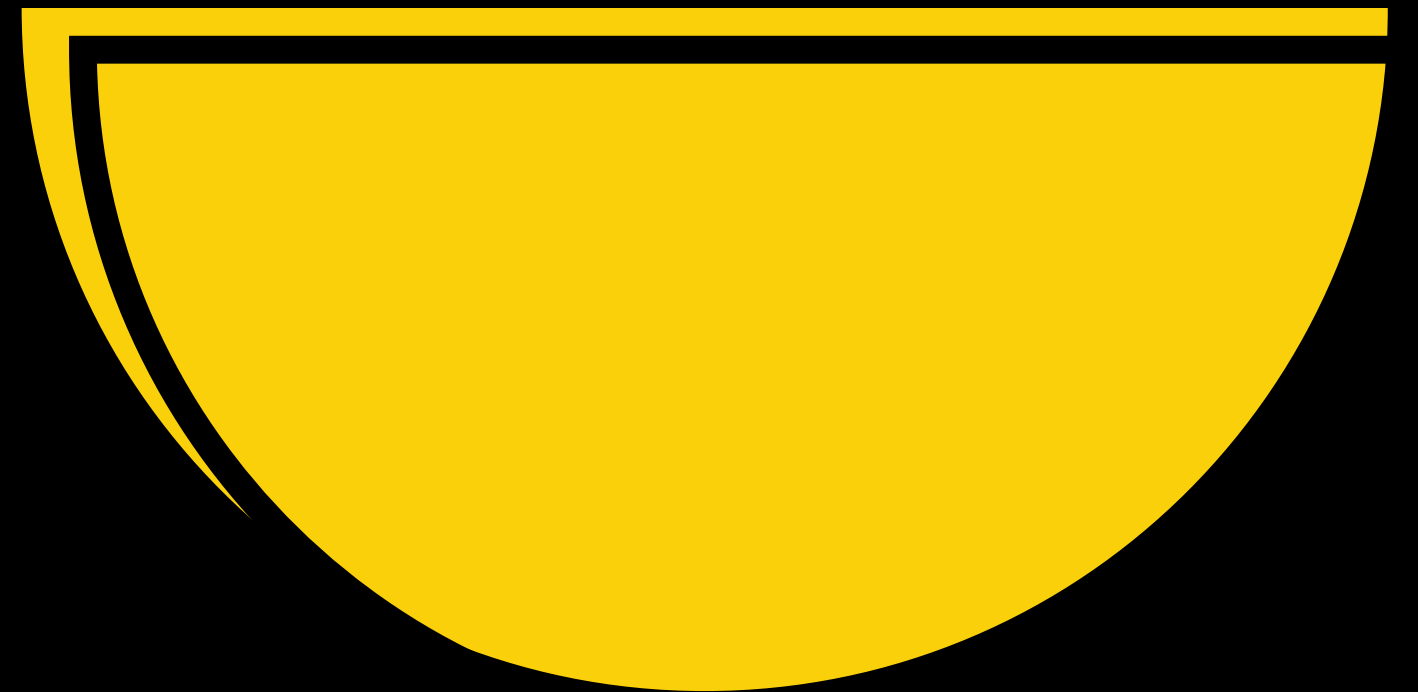
# REFLECTION / ANALYSIS



Numbers are much more than what was taught to us at school. Prior to this, I only thought of numbers as something that could represent quantities in various areas with only applications in the real world. I realized that numerical representations transcend what was taught, it transcends reality and can be used in almost everything, in the case of computer studies, it can be applied to a virtual context as well. Numbers and the number system play a crucial part in everything a computer is doing, from its processing, inputting, and outputting information up to down its very core, a computer's architecture. The concept of binary is something that is familiar, yet something that is new to me. I just realized now how big of an impact 2 digits can do. It may only be 0 and 1, but the utility they provide to not just in the field of computer, but also in anything related to the digital world, is so big that without them, the technology we have now may be a lot harder to comprehend, or it might even be non-existent in the first place.

For the other system, they bring just as big as importance of the binary system. With the help of Octal and the Hexadecimal System, we can in a way, communicate with computers with both sides understanding each other immediately. This system allows programmers, engineers, developers, designers, and any other people working with digital products and services to work efficiently and sometimes effectively. These two systems serve as the bridge that closes the gap between human rationalizing and digital rationalizing, not only to the ones working with it, but also to people who use technology in a day-to-day basis with the translation of the binary to information being done already by both the developers and the computer itself. Numbers aren't only representation of quantities and the main focus of the mathematics field, but it can also serve as the key that unlocks the potential that technology has in store for humanity.

REFLECTION  
/ ANALYSIS





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