NUMBER SYSTEMS | PORTFOLIO #3

By Clydd Harvey Diocampo

NUMBER SYSTEM

A number system is defined as a system of writing to express numbers. It is the mathematical notation for consistently employing digits or other symbols to represent numbers inside a specific set. It gives each number a distinct representation and shows the figures' algebraic and mathematical structures. Arithmetic operations such as addition, subtraction, multiplication, and division can also be performed using it.

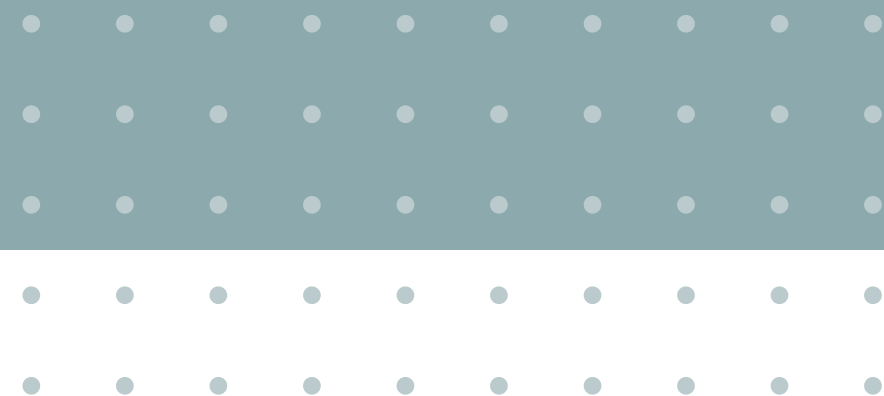# TYPES OF NUMBER SYSTEMS

- Binary
- Decimal
- Octal
- Hexadecimal
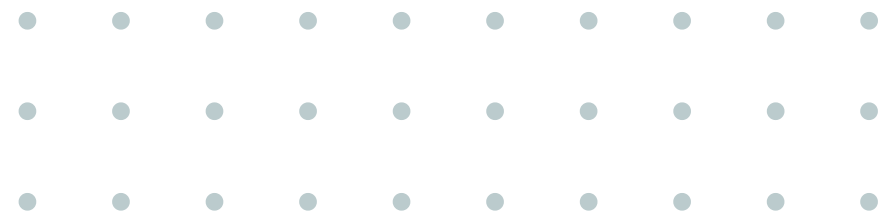
# BASE 2   BINARY SYSTEM

A Binary number system has only two digits that are **0** and **1**. Every number (value) represents with **0** and **1** in this number system. The base of binary number system is 2, because it has only two digits.

BASE 10   DECIMAL SYSTEM

Decimal number system has only ten (10) digits from 0 to 9. Every number (value) represents with 0,1,2,3,4,5,6, 7,8 and 9 in this number system. The base of decimal number system is 10, because it has only 10 digits.
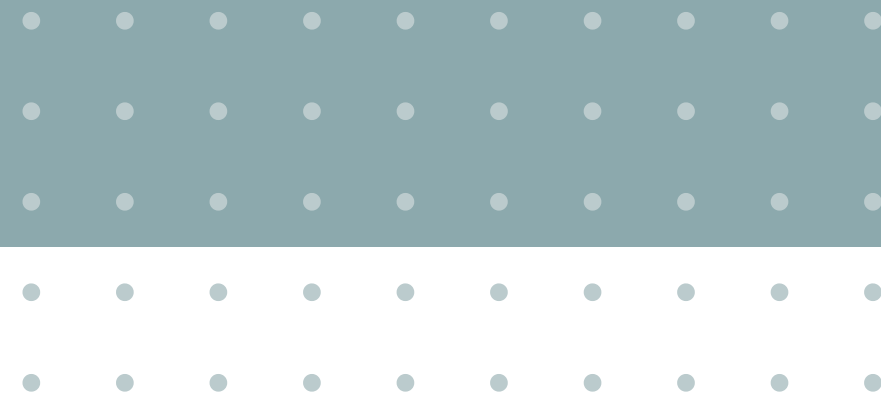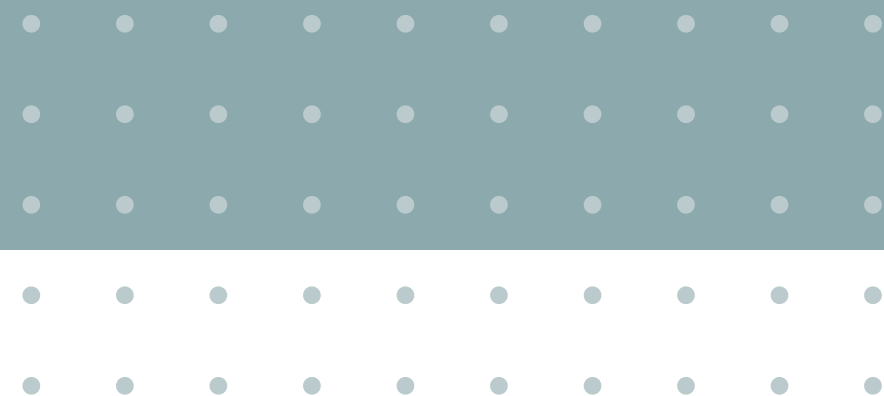
BASE 8

OCTAL SYSTEM

Octal number system has only eight (8) digits from 0 to 7. Every number (value) represents with 0,1,2,3,4,5,6 and 7 in this number system. The base of octal number system is 8, because it has only 8 digits.

BASE 16

HEXADECIMAL SYSTEM

A Hexadecimal number system has sixteen (16) alphanumeric values from 0 to 9 and A to F. Every number (value) represents with 0,1,2,3,4,5,6, 7,8,9,A,B,C,D,E and F in this number system. The base of hexadecimal number system is 16, because it has 16 alphanumeric values. Here A is 10, B is 11, C is 12, D is 14, E is 15 and F is 16.

WHAT IS THE IMPORTANCE OF THE NUMBER SYSTEM?

- allows for the precise and distinctive display of various integers.

- aids in keeping count of things.

- utilized in the banking industry for calculating.

- aids in data encryption, prevents data abuse and hacking.

- makes it simple to convert numbers for technical applications.

- It should be mentioned that every data fiber is converted to a number and saved in the computer.

USES OF EACH NUMBER SYSTEM

Binary Number System: The binary number system is the base of all computing systems and operations. It enables devices to store, access and manipulate all types of information directed to and from the CPU or memory.

Decimal Number System: Decimal is a numbering system that uses a base-10 representation for numeric values. The system is used extensively in everyday life to carry out routine tasks such as buying groceries, trading stocks, tracking football scores or scrolling through cable channels.

USES OF EACH NUMBER SYSTEM

Octal Number System: The Octal Number System is widely used in computer application sectors and digital numbering systems. The computing systems use 16-bit, 32-bit or 64-bit word which is further divided into 8-bits words. The octal number is also used in the aviation sector in the form of a code.

Hexadecimal Number System: Computers employ the Hexadecimal number system to indicate memory addresses, which can be either 16 or 32 bits long. A memory address of 1101011010101111, for instance, is a large binary address; yet, it is simpler to memorize as D6AF in hex. Color codes are also represented by numbers in the Hexadecimal number system. For instance, the colors FFFFFF and FF0000 stand for White and Red, respectively.

HOW ARE NUMBER SYSTEMS USED IN REAL LIFE?

We can determine how much an object needs to be limited by using the number system. These provide us with a broad understanding of the mathematical procedures pertaining to the specified numbers. This facilitates the use of mathematical procedures to calculate numbers. This provides us with an estimate of an object's size or distance.

These are essential to our ability to manage money. These aid us in deriving equation and arithmetic progression solutions. These aid us in doing broad computations and arriving at a certain conclusion. These aid in our daily adherence to general mathematics.
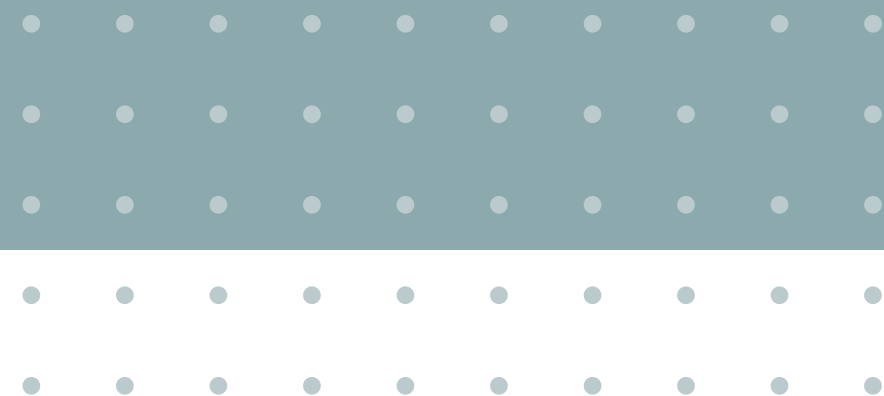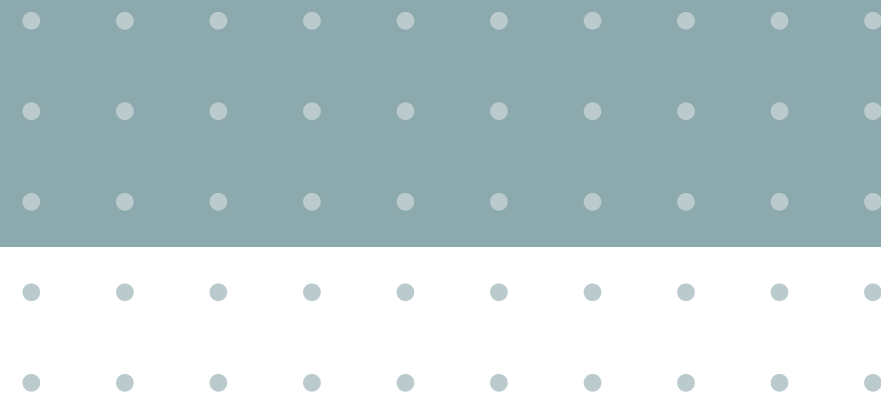
REFLECTION/ANALYSIS

Number systems are basic frameworks for expressing and manipulating numbers, which are essential in both daily life and fields such as computers and engineering. They offer a systematic approach to expressing values and performing mathematical operations, with each adapted to a certain use and setting.

The decimal system, known as base 10, is the most widely used number system. It uses 10 symbols (0 through 9) to represent numbers in a positional system, with each digit's place value being a power of ten. This makes computations simple and logical for human beings. This system is prevalent in daily life, trade, and education due to its how well it works with human cognitive processes, which are most likely due to its similarity with the 10 fingers used for counting.

In contrast, the binary number system or base 2 uses just two symbols: 0 and 1. Each digit's location signifies a power of two. Binary is the language of computers and is essential in computing because it corresponds exactly to the binary state of electronic circuit, which can be off (0) or on (1). This simplicity in data representation allows for efficient storage and processing in technology, this serves as the foundation for all modern computing.

REFLECTION/ANALYSIS

The octal number system, or base 8, uses eight symbols (0-7) and was historically significant in computing. Each digit represents a power of 8. Though it is less commonly used today, the octal number system was once a useful translation for binary data, offering a more concise way to represent binary numbers without extensive conversion. Its relevance has diminished with the rise of hexadecimal but remains a part of computing history.

Hexadecimal number system, known as base 16, is a numerical system that expresses values using sixteen symbols (0-9 and A-F). Each digit in a hexadecimal integer represents a power of sixteen. Hexadecimal is a more compact and human-readable way to represent binary-coded information, which makes it especially useful for programming and debugging. It facilitates the interaction with complicated binary data and memory addresses, bridging the gap between human cognition and machine actions.

Number systems have a variety of practical applications. The decimal system is designed for broad usage and human interaction, binary supports digital technology, hexadecimal enables efficient data representation in programming, and octal represents past computer methods. Each system's distinct qualities and applications emphasize the versatility and depth of how numbers can be represented and systemized.
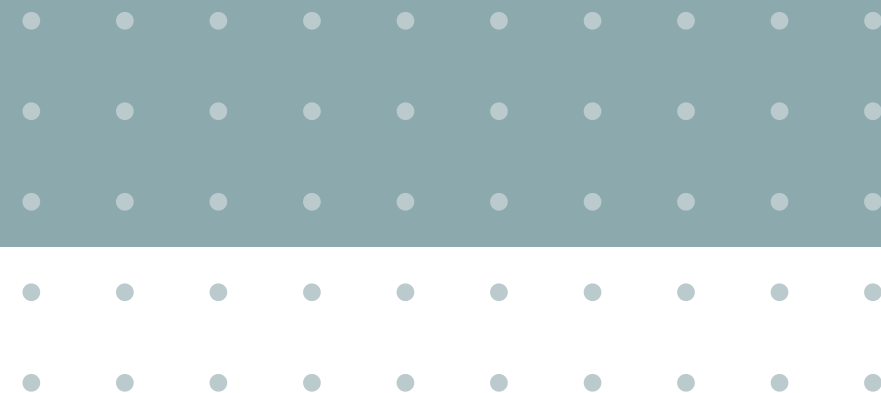
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