



# FOURTEEN #3

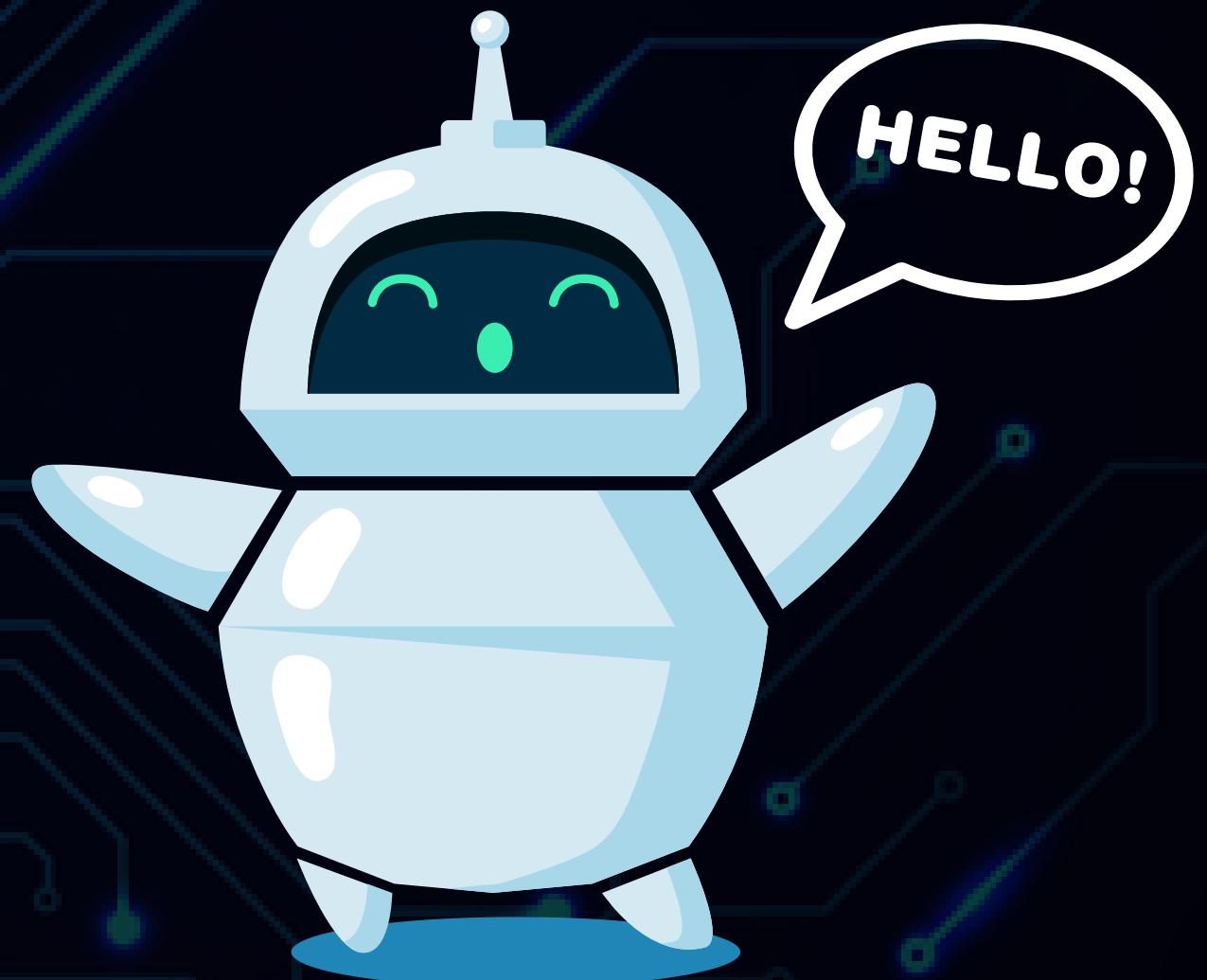
## NUMBER SYSTEMS



TJC, TABURA  
BSIT - 1

# TOPIC OUTLINE:

- WHAT ARE NUMBER SYSTEMS?
- TYPES OF NUMBER SYSTEM?
- WHAT ARE THE USES/SIGNIFICANCE OF EACH NUMBER SYSTEMS?
- REFERENCES
- ANALYSIS/REACTION



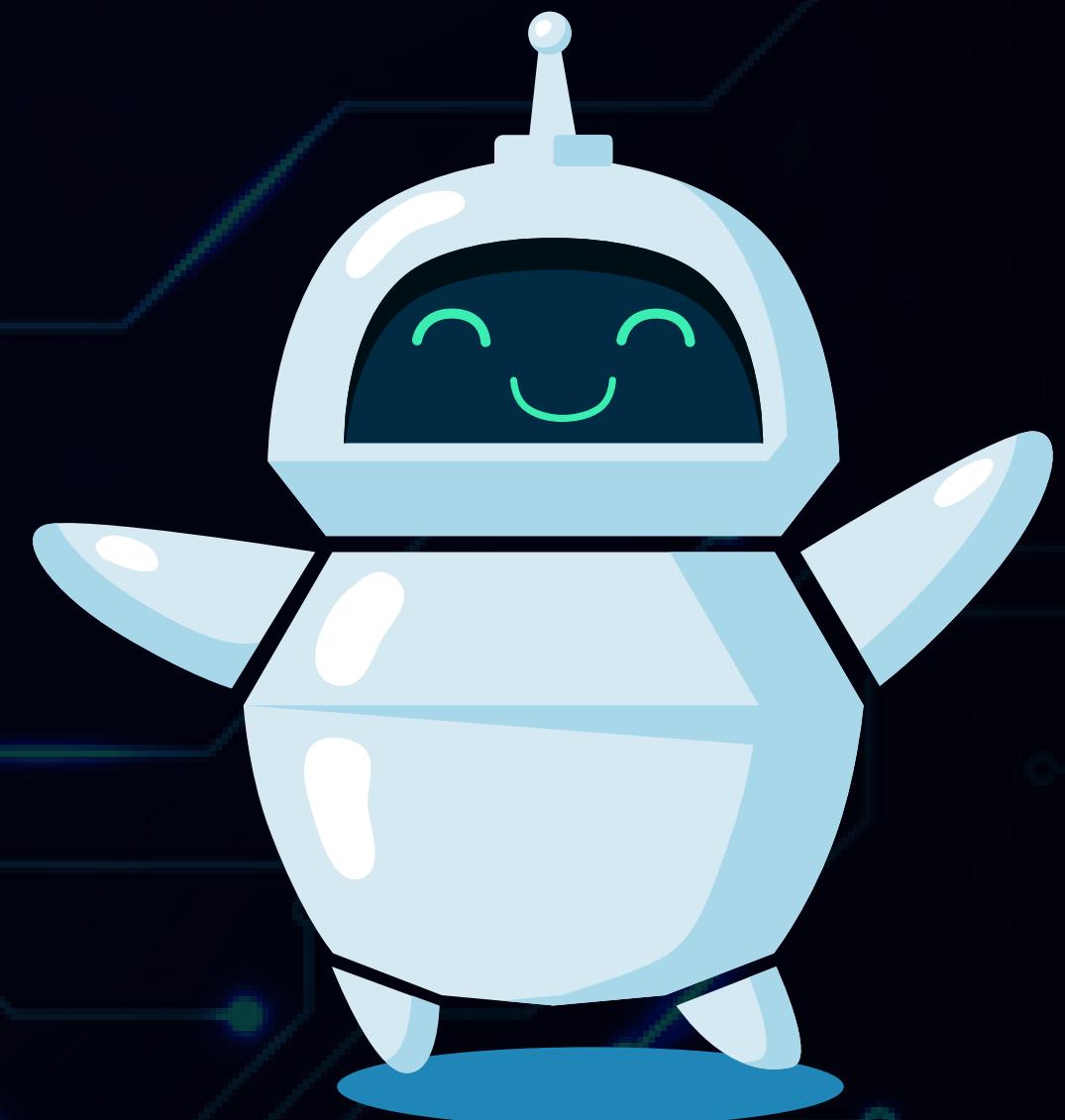
# WHAT ARE NUMBER SYSTEMS?

Number systems are methods of representing numbers using a consistent set of symbols or digits. They are fundamental to mathematics and computer science, as they provide a way to encode, manipulate, and communicate numerical information.

# WHAT ARE NUMBER SYSTEMS?

The value of any digit in a number can be determined by:

- The digit
- Its position in the number
- The base of the number system



# THREE OF NUMBER SYSTEM

There are various types of number systems in mathematics. The four most common number system types are:

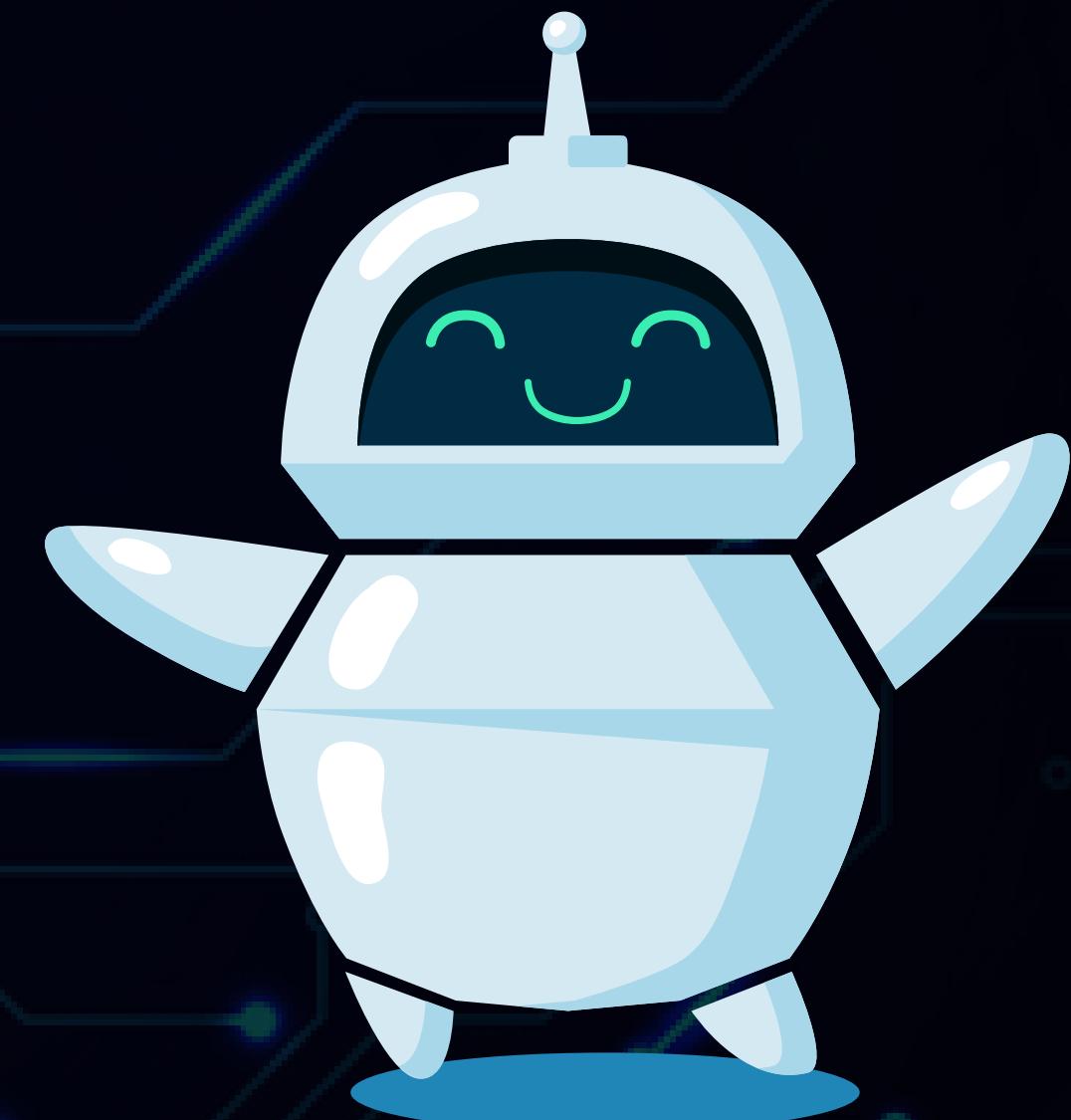
1. Decimal number system (Base- 10)
2. Binary number system (Base- 2)
3. Octal number system (Base-8)
4. Hexadecimal number system (Base- 16)



## TYPES OF NUMBER SYSTEMS

Decimal Number System (Base 10 Number System)

The decimal number system has a base of 10 because it uses ten digits from 0 to 9. In the decimal number system, the positions successive to the left of the decimal point represent units, tens, hundreds, thousands and so on. This system is expressed in decimal numbers. Every position shows a particular power of the base (10).

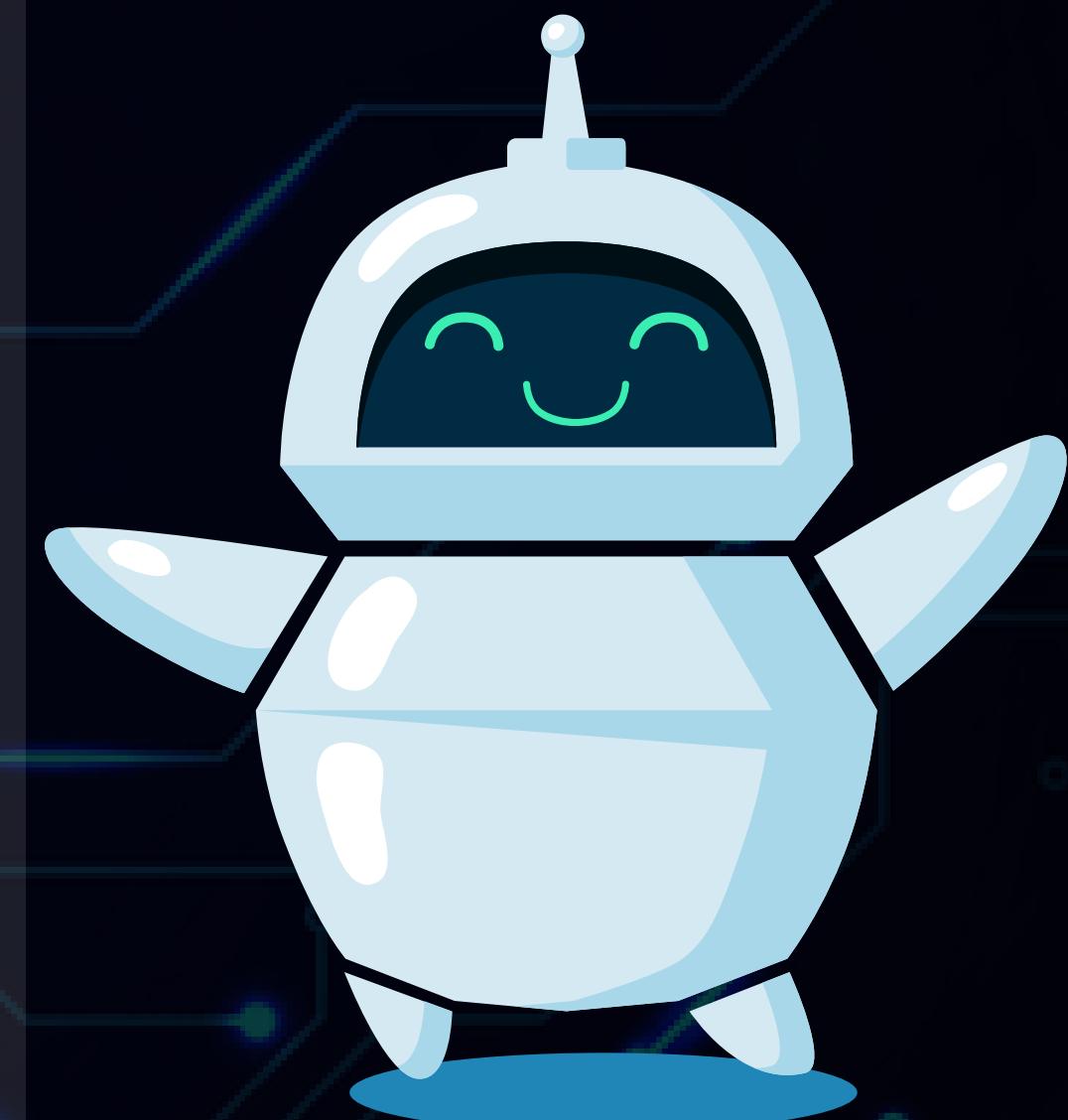


## TYPES OF NUMBER SYSTEMS

### Binary Number System (Base 2 Number System)

The base 2 number system is also known as the Binary number system wherein, only two binary digits exist, i.e., 0 and 1. Specifically, the usual base-2 is a radix of 2. The figures described under this system are known as binary numbers which are the combination of 0 and 1. For example, 110101 is a binary number.

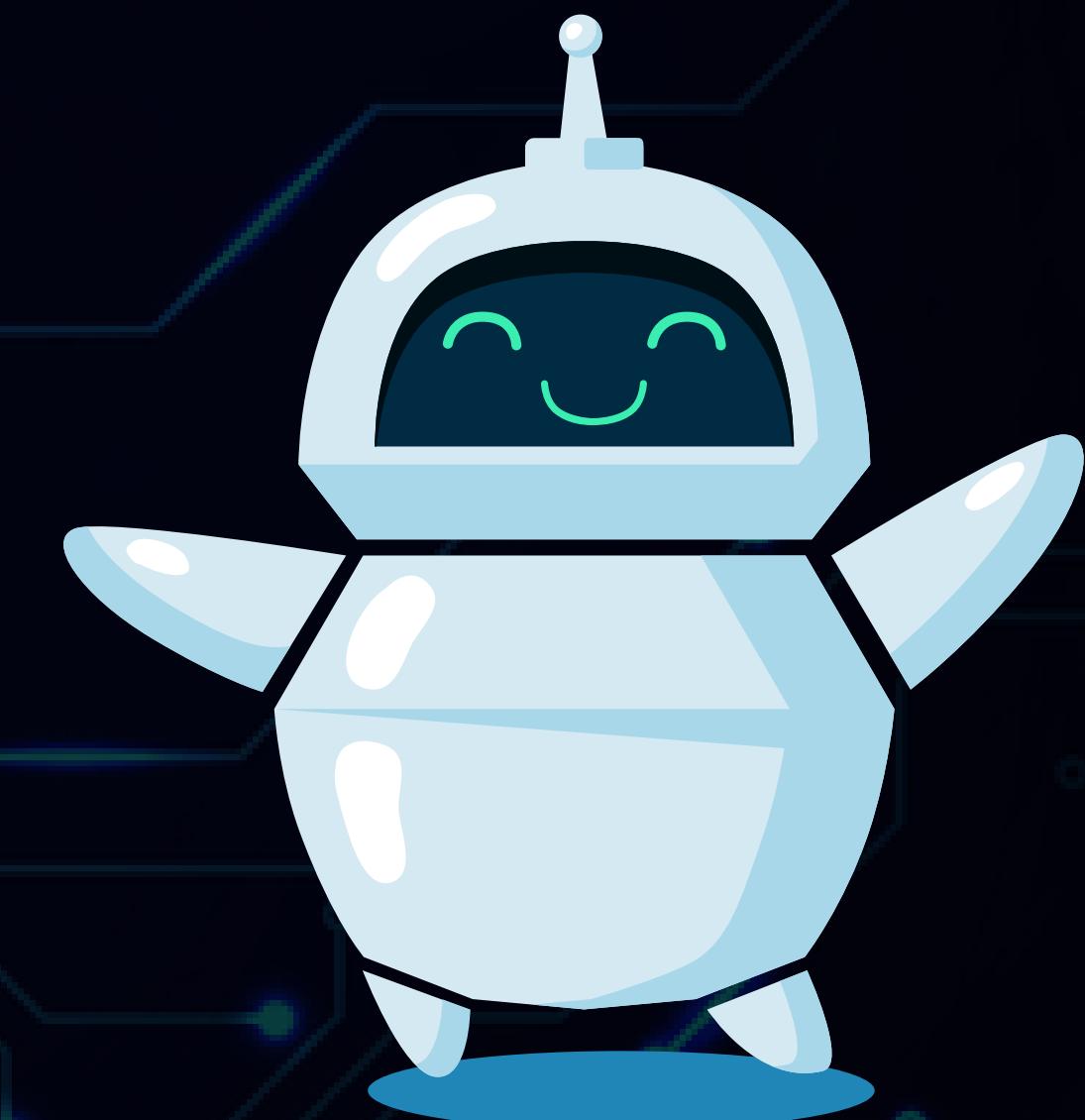
We can convert any system into binary and vice versa.



## TYPES OF NUMBER SYSTEMS

Octal Number System (Base 8 Number System)

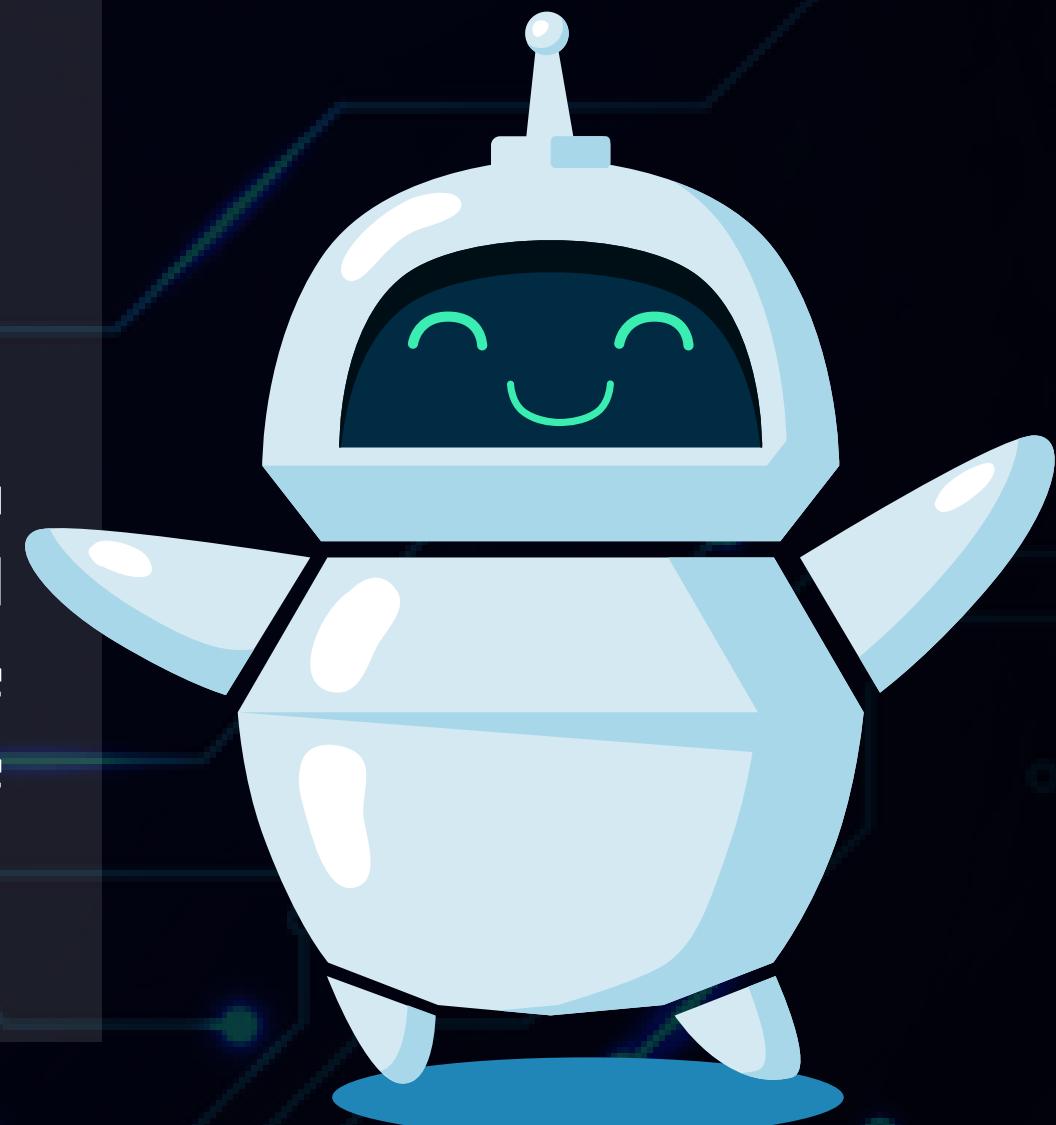
In the octal number system, the base is 8 and it uses numbers from 0 to 7 to represent numbers. Octal numbers are commonly used in computer applications. Converting an octal number to decimal is the same as decimal conversion and is explained below using an example.



## TYPES OF NUMBER SYSTEMS

### Hexadecimal Number System (Base 16 Number System)

In the hexadecimal system, numbers are written or represented with base 16. In the hexadecimal system, the numbers are first represented just like in the decimal system, i.e. from 0 to 9. Then, the numbers are represented using the alphabet from A to F. The below-given table shows the representation of numbers



# • WHAT ARE THE USES/SIGNIFICANCE OF EACH NUMBER SYSTEM?

- Decimal System:
  - Uses: General counting, financial transactions, scientific measurements.
  - Significance: It is the most widely used number system, integrating seamlessly with human cognitive and practical needs.
- Binary System:
  - Uses: Computers, digital electronics, encoding information.
  - Significance: The core of modern computing and digital technology, enabling complex processing and data storage.
- Octal System:
  - Uses: Simplifies binary code, used in some computer systems and programming contexts.
  - Significance: Provides an intermediary between binary and decimal systems, simplifying certain calculations.
- Hexadecimal System:
  - Uses: Programming, color coding in web design, memory address representation.
  - Significance: Efficient representation of binary data and facilitates easier reading and manipulation in computer science



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# ANALYSIS/REACTION

I learn that number systems are foundational in our understanding of mathematics and the digital world. Providing a structured way to represent and process numerical information, the number system is not an abstraction. At its very core, it is more so a practical tool that drives much of our life and technological interactions. It stands at the core of much encodings managing and communicating numeric data, telling us much about human cognition as well as computational logic. A number is a value in mathematics that can be used to measure, count, or label objects. Arithmetic computations are done with numbers. Natural numbers, whole numbers, rational and irrational numbers, and so on are examples of numbers. The number 0 also denotes a null value. There are numerous more ways to divide a number, including prime and composite numbers, even and odd numbers, etc. When a number is divisible by two or not, it is referred to as even or odd; on the other hand, prime and composite phrases distinguish between numbers with two elements or more. These numbers function as digits in a number system. The most widely used digits in the number system to express binary numbers are 0 and 1. Number systems are fundamental to both theoretical mathematics and practical applications. They serve as the backbone of numerical representation, enabling us to encode, manipulate, and interpret numerical information effectively. The study of different number systems—Decimal, Binary, Octal, and Hexadecimal



THANK YOU!!!

