

Number Systems & storage

- Number systems are sets of **characters** that represent specific **number values**
- The most common is the **decimal** system
- It contains 10 unique characters (it is '**base 10**')
- To represent values greater than 10, the unique characters can be combined with each other:

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19

- The **Binary** number system is important in computing
- It contains 2 unique characters (it is '**base 2**')
- To represent values greater than 2, the unique characters can be combined with each other:

0	1
01	11

- The **Hexadecimal** number system is often used to represent binary in a more compact form
- It contains 16 unique characters (it is '**base 16**')
- To represent values greater than 16, the unique characters can be combined with each other:

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F

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Why Binary?

- Computers use binary in storage because it aligns with the electronic nature of computer hardware.
- Binary simplifies electronic circuitry design and facilitates logical operations and mathematical computations.
- Binary storage is reliable, scalable, and compatible with various storage media.
- Binary's two-digit system (0s and 1s) efficiently represents and processes information in computers.

Common Storage Standards

- Signed integers: Sign and Magnitude, One's Complement, **Two's Complement**, and others.
- Floating-point representations: **IEEE 754**, which includes variations such as **single precision (32 bits)**, double precision (64 bits), and others.
- Text: **ASCII**, Unicode, UTF-16, and others.



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