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Explain Hash Function



A hash function is a mathematical function that takes an input (or 'message') and returns a fixed-sized string of bytes. The output, known as the 'hash' or 'message digest', is unique to each unique input and is ideally resistant to any changes in the input data. Hash functions are commonly used for digital signature algorithms, data structures such as hash tables, and as a component of many cryptographic protocols for data integrity and authentication.



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Give a example



One example of a hash function is the SHA-256 algorithm, which is widely used in cryptography. Given an input message, the SHA-256 algorithm produces a fixed-sized 256-bit output, often represented as a 64-character hexadecimal string. For example, the SHA-256 hash of the string "hello" is:

"185f8db32271fe25f561a6fc938b2e264306ec304eda518007d1764826381969"

Note that even a small change in the input message will result in a completely different hash output, making hash functions useful for verifying the integrity of data.



