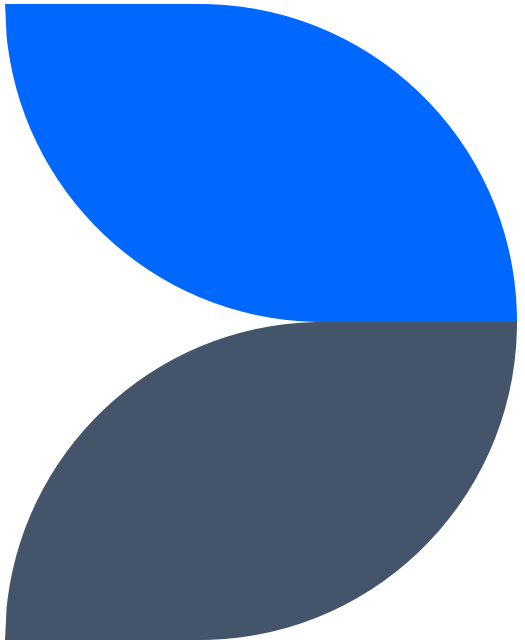
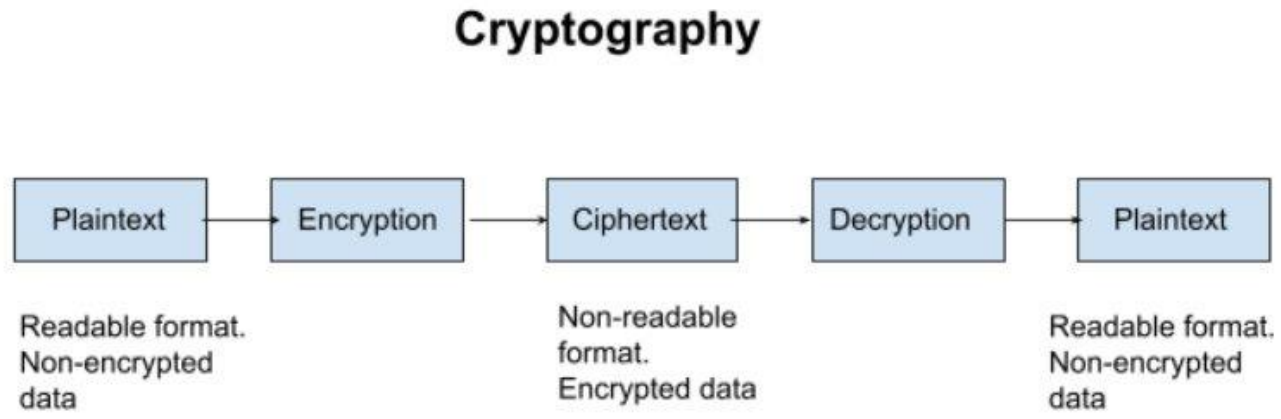
Cryptography

Summer B.



What is it?

- Cryptography is the process of hiding or coding information so that only the person a message was intended for can read it.

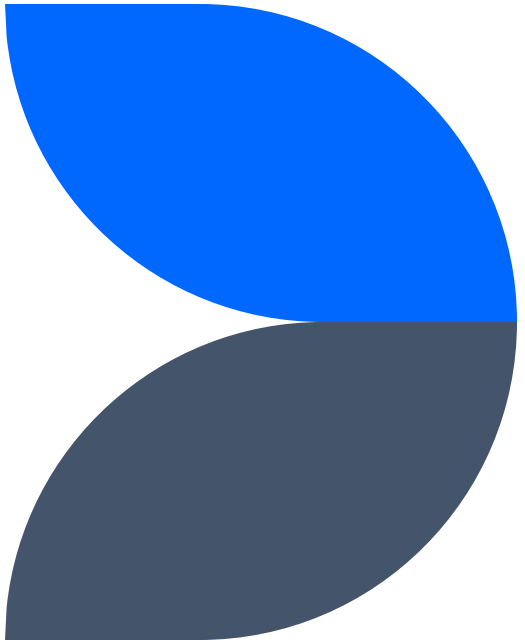


Why Is It Important?

- Protects sensitive data
- Ensures privacy and trust online
- Guards against cyberattacks and fraud

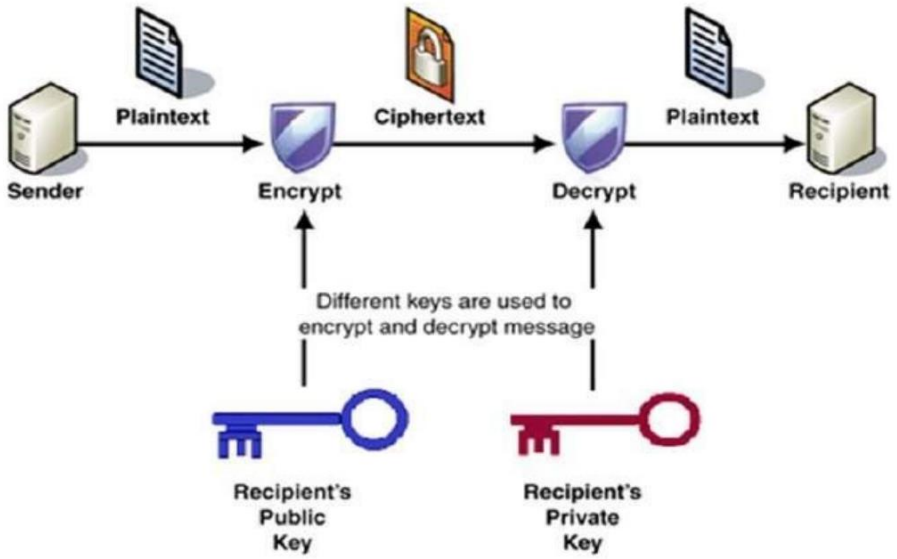
Examples of Cryptography

- Voting Systems and Election Security: methods such as **end-to-end verifiable encryption** are explored for **secure electronic voting** and to ensure votes are counted correctly without tampering.
- Law Enforcement and Cryptographic Evidence: Governments may use encryption to store evidence securely or digital forensic tools (some involving cryptography) to unlock devices lawfully.



How Does It Work?

- Choose a symmetric encryption algorithm for you and the person you're communicating with, for this example-AES (Advanced Encryption Standard)
- Then you generate a "random secret key" that there are programs to assist with translation such as 11223344aabbcc
- This key will help you generate an output for your input. If we had an input "hello", the output could be 0f6bg00g



Challenges Using Cryptography

- Quantum computing threatens traditional encryption.
- Key management is complex.
- Implementation flaws (not the math, but the coding) often lead to breaches.

Citing sources

IBM-https://www.ibm.com/think/topics/cryptography-use-cases

Questions?