



CRYPTOGRAPHY AND STEGANOGRAPHY

Department of Informatics

Session 2 – Difference Between Cryptography and Steganography

Ambros Magnus Rudolf Mekeng,
S.T.,M.T

Abdul Azzam Ajhari, S.Kom.,
M.Kom.



- In addition to encoding with cryptography, information can also be secured from unauthorized access using steganography.
- Steganography: the science and art of hiding secret messages in other media so that their existence is undetectable.



**Bomb exploded at
20.00 WIB**





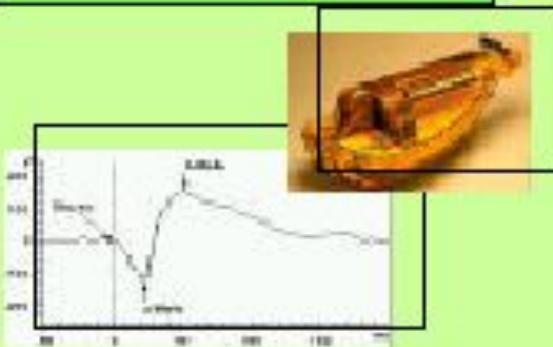
Difference Between Cryptography and Steganography

- Cryptography: hiding the content of a message
 - Purpose: so that the message cannot be read by a third party (opponent)
- Steganography: hiding the existence of a message
 - Purpose: to avoid suspicion (conspicuousness) from a third party (opponent)



Stego-data are inconspicuous.
Steganography will **not be detected.**

George obtains oranges yet eight's are rubbish



Encrypted messages are conspicuous. They will be detected as ciphertext or silly data.

```
HlwDIwFpbAtjdf0BA/9KBX2jS17O5SRQsu2PF  
caBqUXIQdyt1Fri/Wsg+eXoYsxnJI1Cn2JD7vjI  
P2GH8GEr/vGQk8SQVCMyXzfPkgW0tr6RJX  
AEIFF9rjnDB3kOmMvC1adrTQnLrqjC/I5r&J  
ezowgZl82T/QVkJ59YsuChd+Ce8vql/klCe  
mvw9J2amre3uxpWIOqCEQNzZyHx8HeYPf29k  
Xu+uk1gekZZVdELmLD/Wa/xBKFTNUBrI+16  
ewoQBxQ8+3cTXSIGPTqdzDSasgQG17Z1sr  
/Lhu0qzem64GYY0QukeiGPvhHJQuXZa2UW
```



Digital Steganography

- Digital steganography: the hiding of a digital message within another digital document.
- Carrier file: a digital document used as a medium to hide a message.

1. Text

“We are all brothers and sisters”

- txt
- doc
- html

2. Audio



- wav
- mp3

3. Gambar (*image*)



- bmp
- jpeg
- gif

4. Video



- Mpeg
- avi
- dll

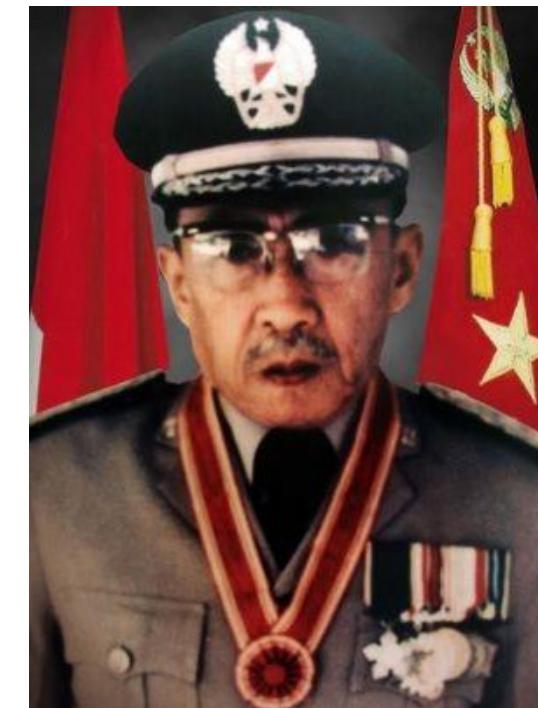


cryptography doesn't 'solve' protection issues but hopefully turns them into more simplified problems.

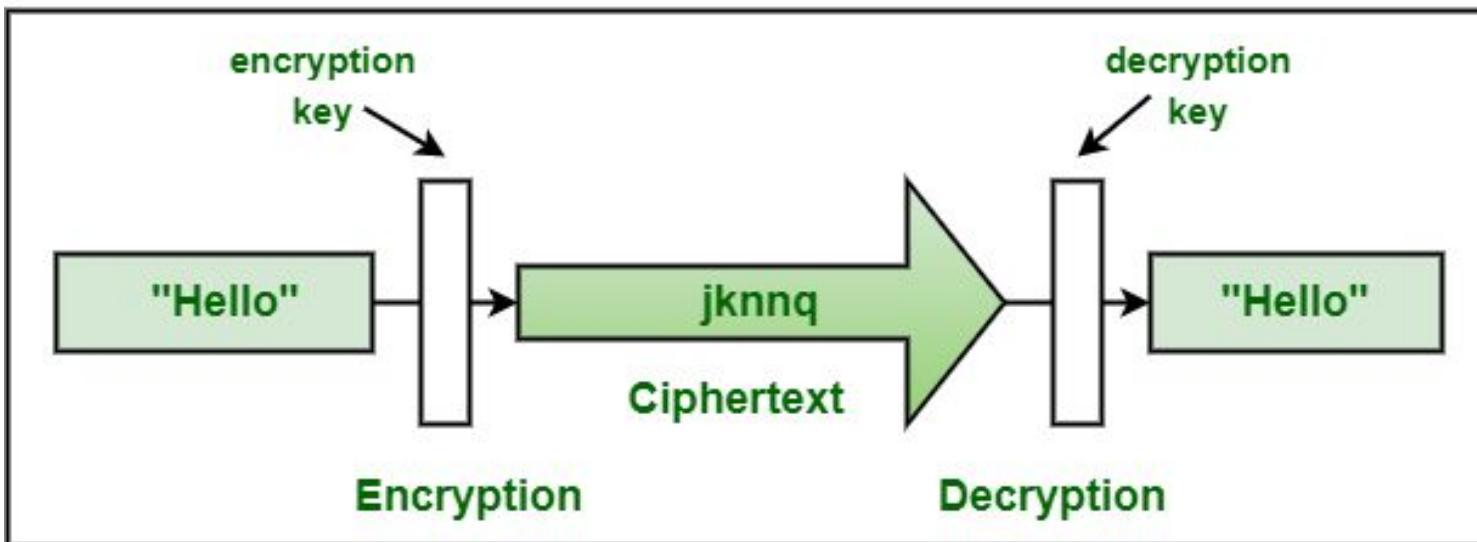
For example: by keeping just the key secret instead of the entire data secret when it is being stored or sent.



1964, Indonesia

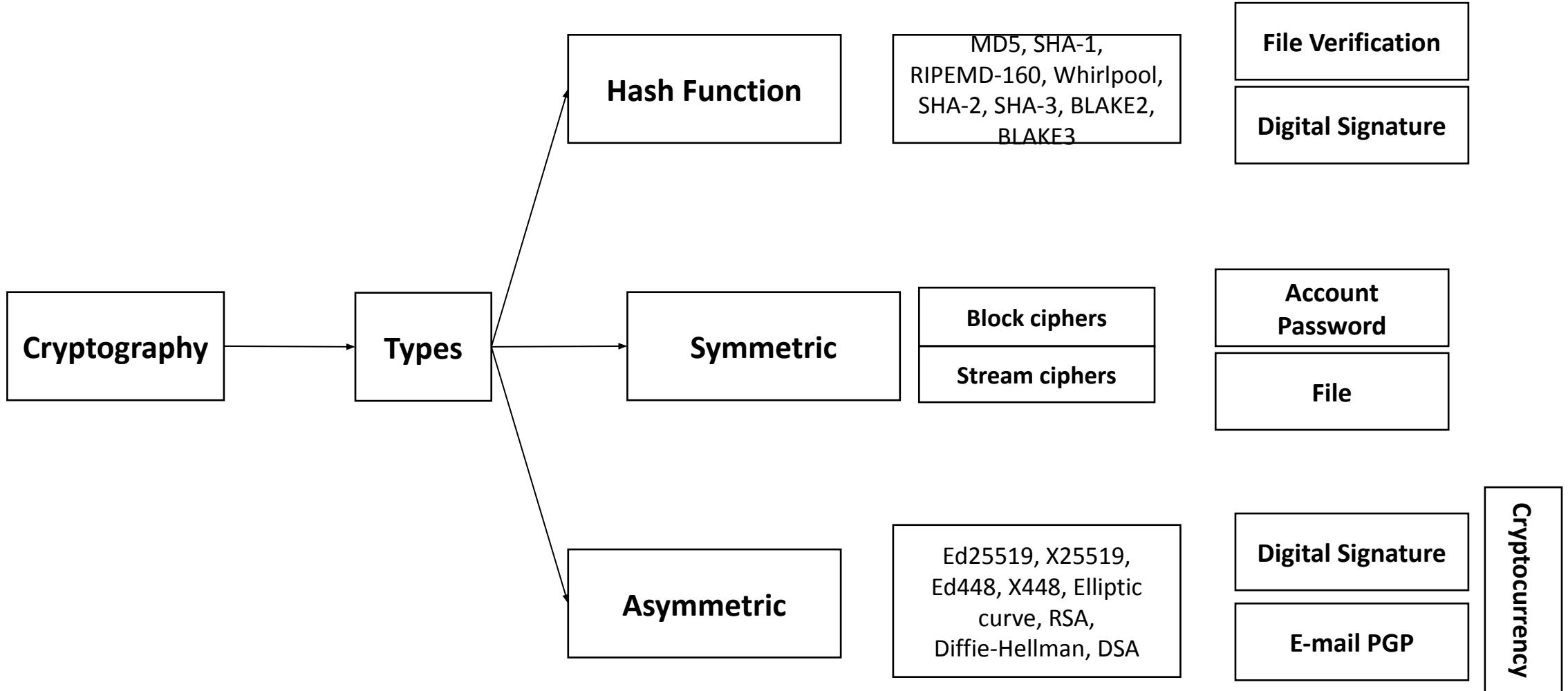


dr. Roebiono
Kertopati



hidin **Cryptography** writin
g

Image from:
<https://geeksforgeeks.org>





Hashing



Plaintext

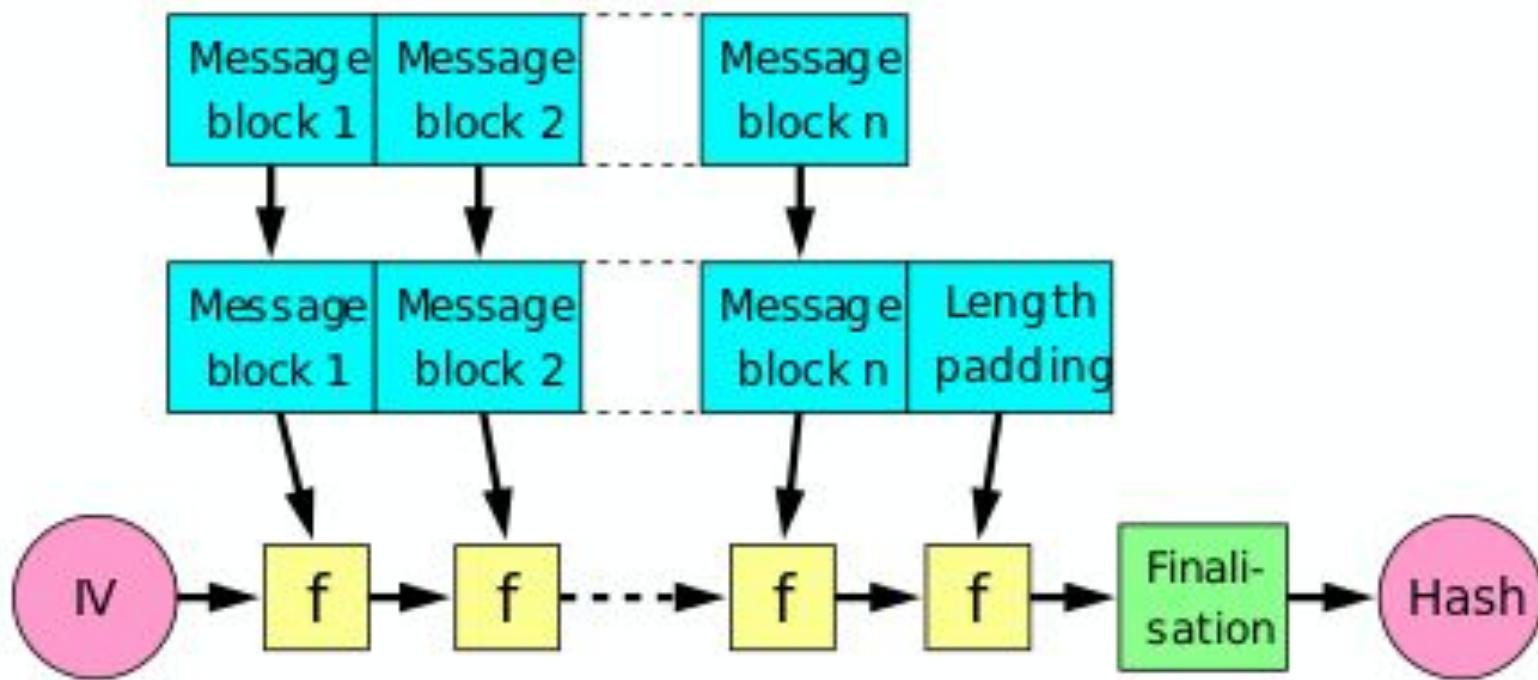
Hash Function

Hashed Text

Image from: <https://adilkazani.com>

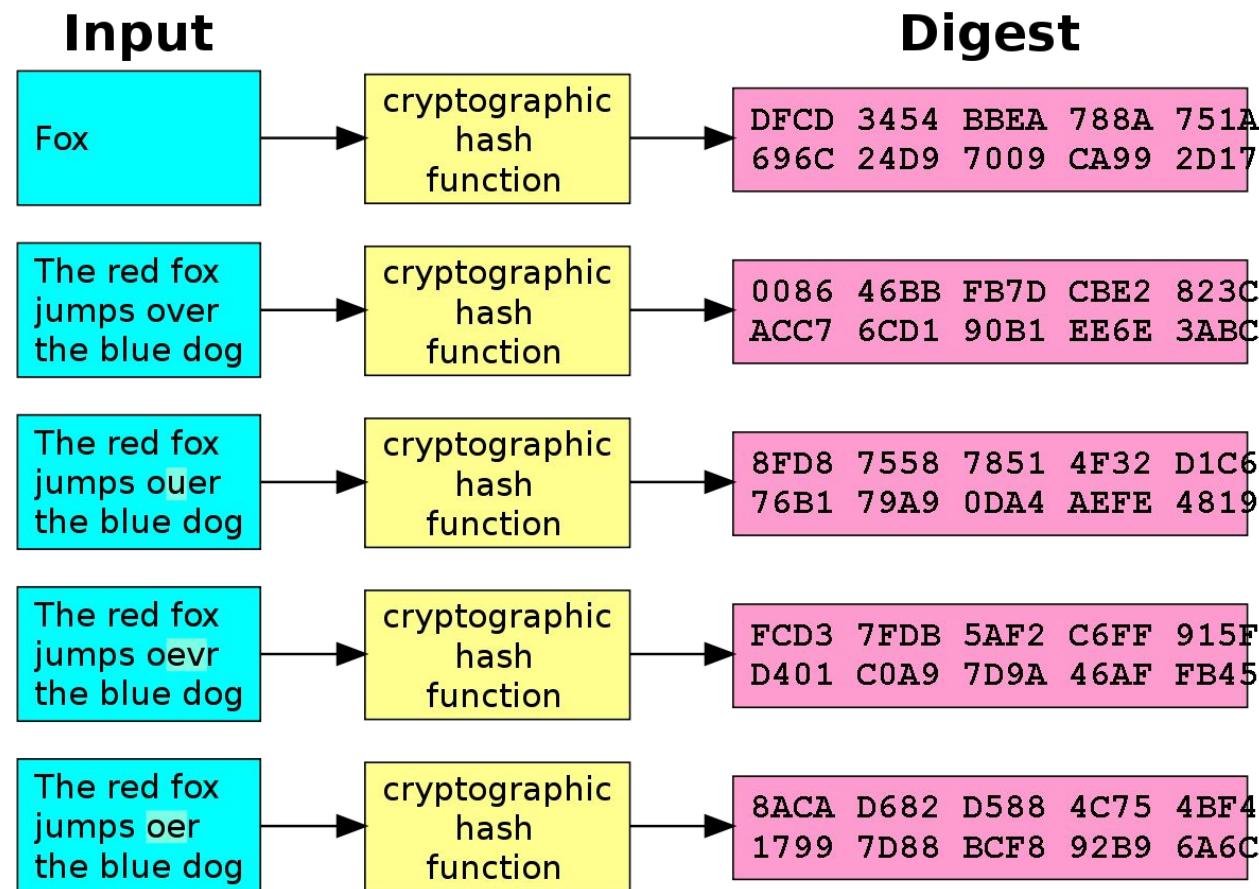


Merkle–Damgård construction





SHA-1





Is Hashing and Encoding the Same technique?

They will both transform data into another format.

Encoding is reversible (public algorithm), hashing is not preserve the integrity of data.



Symmetric Encryption

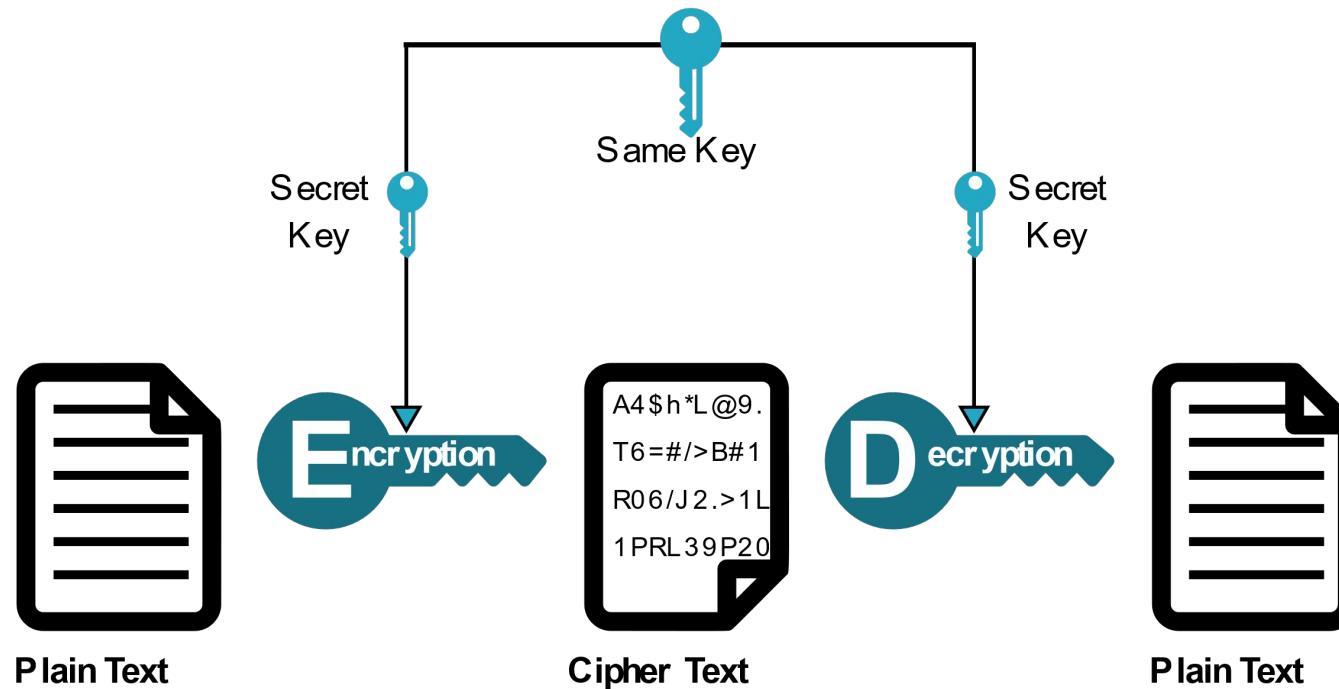


Image from: <https://aboutssl.org/>



Caesar Cipher

Plain: abcdefghijklmnopqrstuvwxyz

Cipher: DKVQFIBJWPESCXHTMYAUOLRGZN

Plaintext: ifwewishtoreplaceletters

Ciphertext: WIRFRWAJUHYFTSDVFSUUUFYA



Asymmetric Encryption

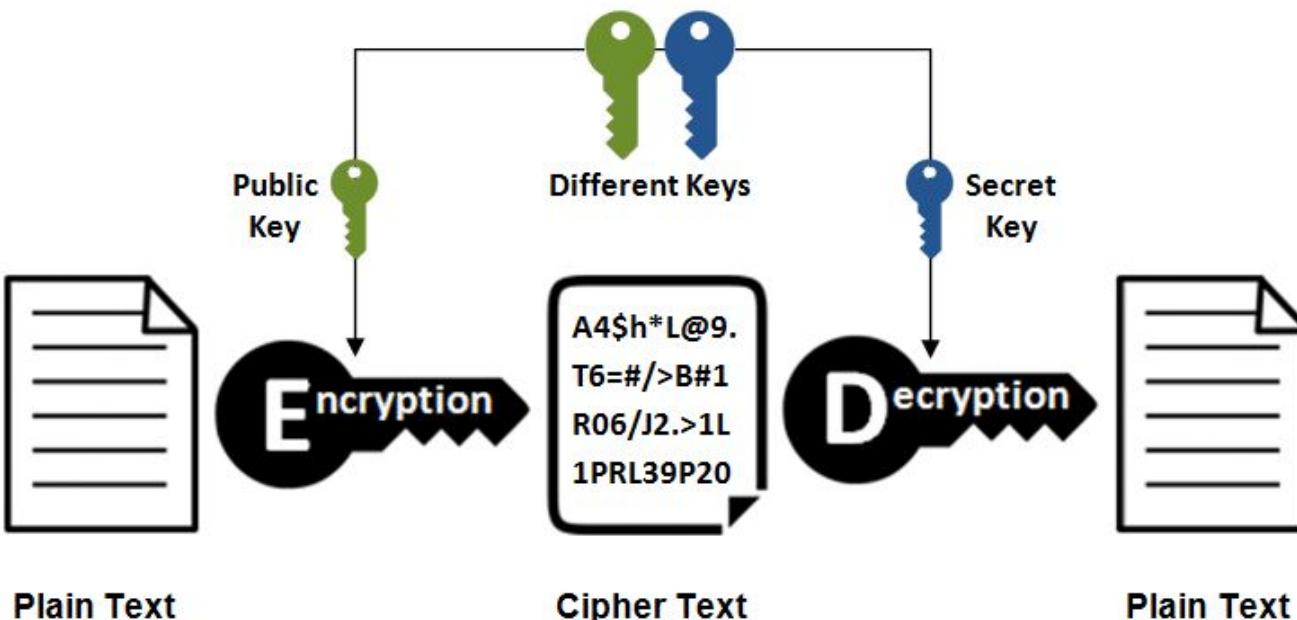


Image from:
<https://selembardigital.com>



Generate New Address Print

Public Address



SHARE

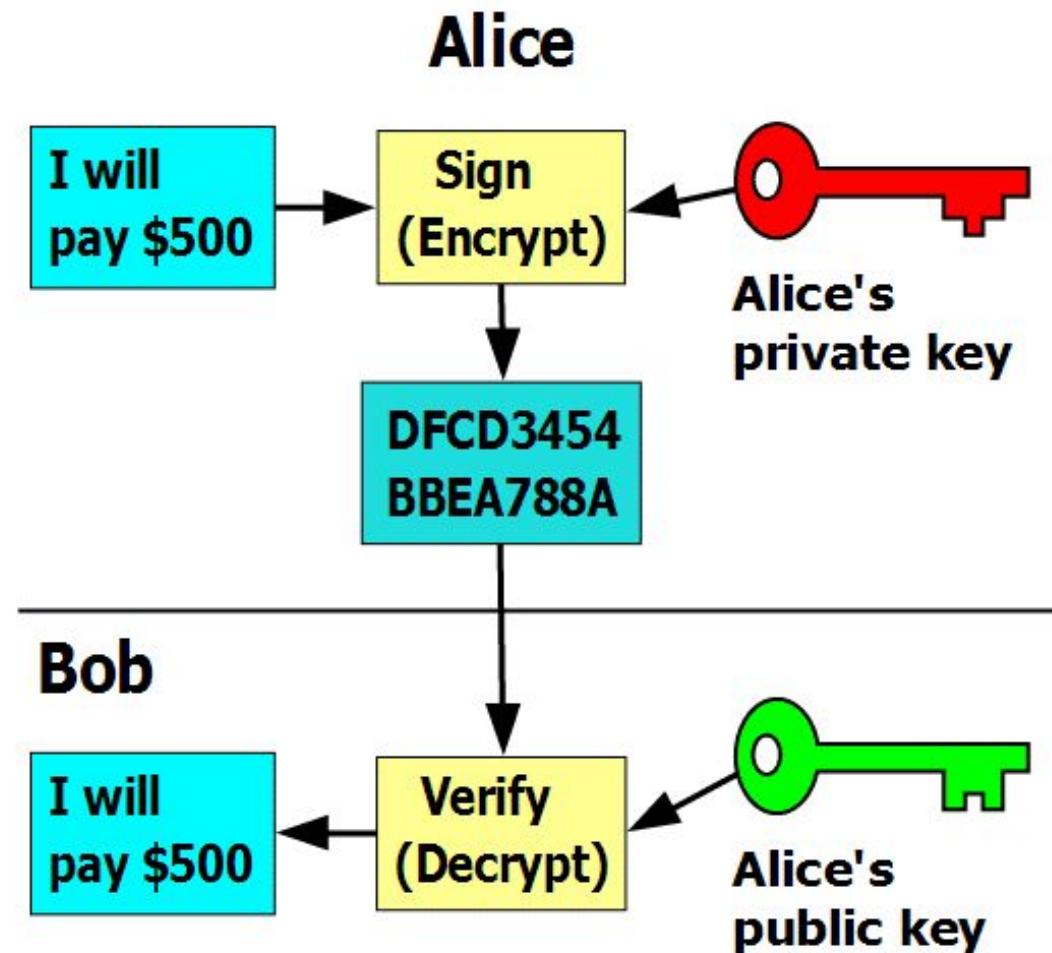
16NZD9iBCbj8NwWrDZnnyw[REDACTED]

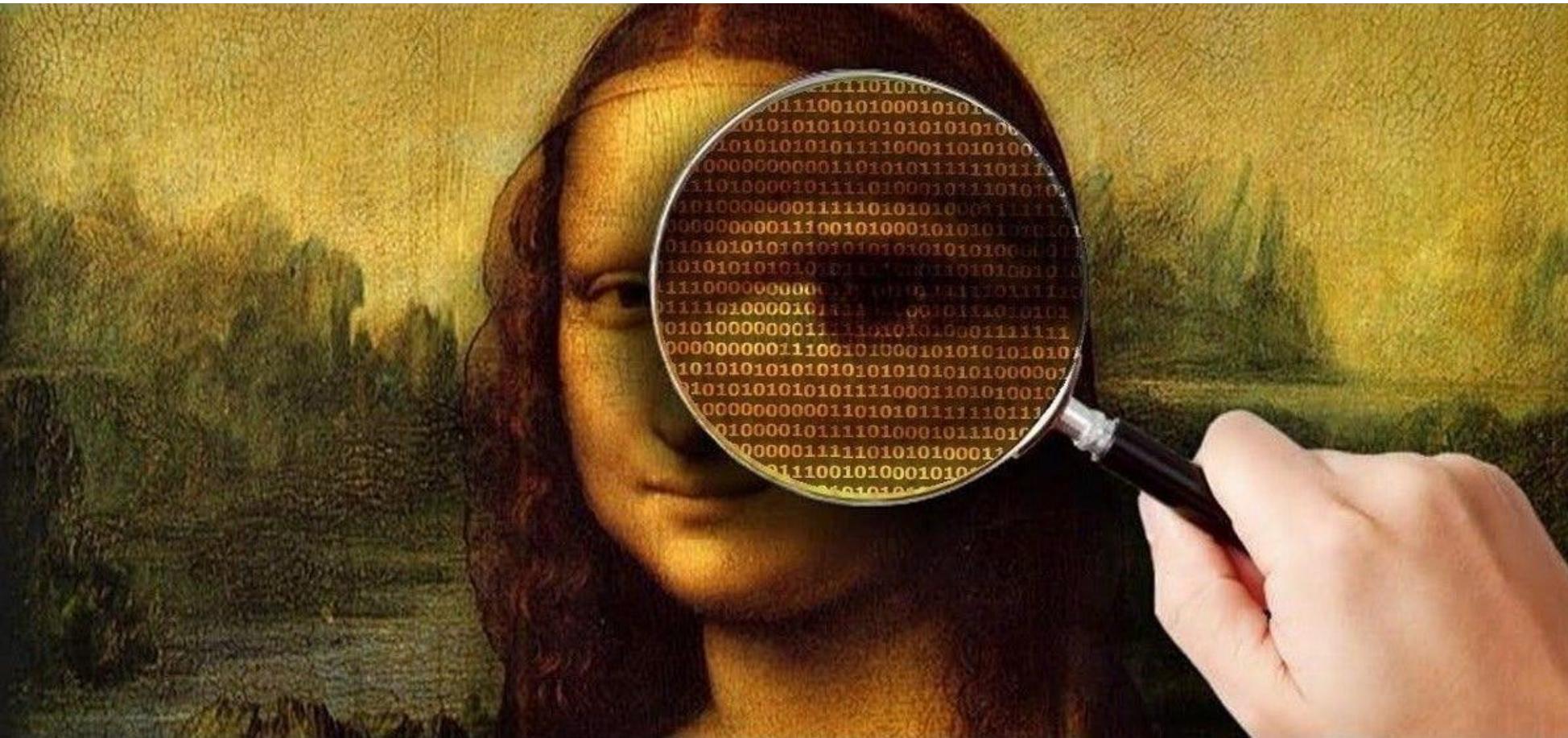
Private Key (Wallet Import Format)



SECRET

5JAG4cZ2JzQMezBd53z[REDACTED]GG7f5vaEuXgyFfH3DiSg





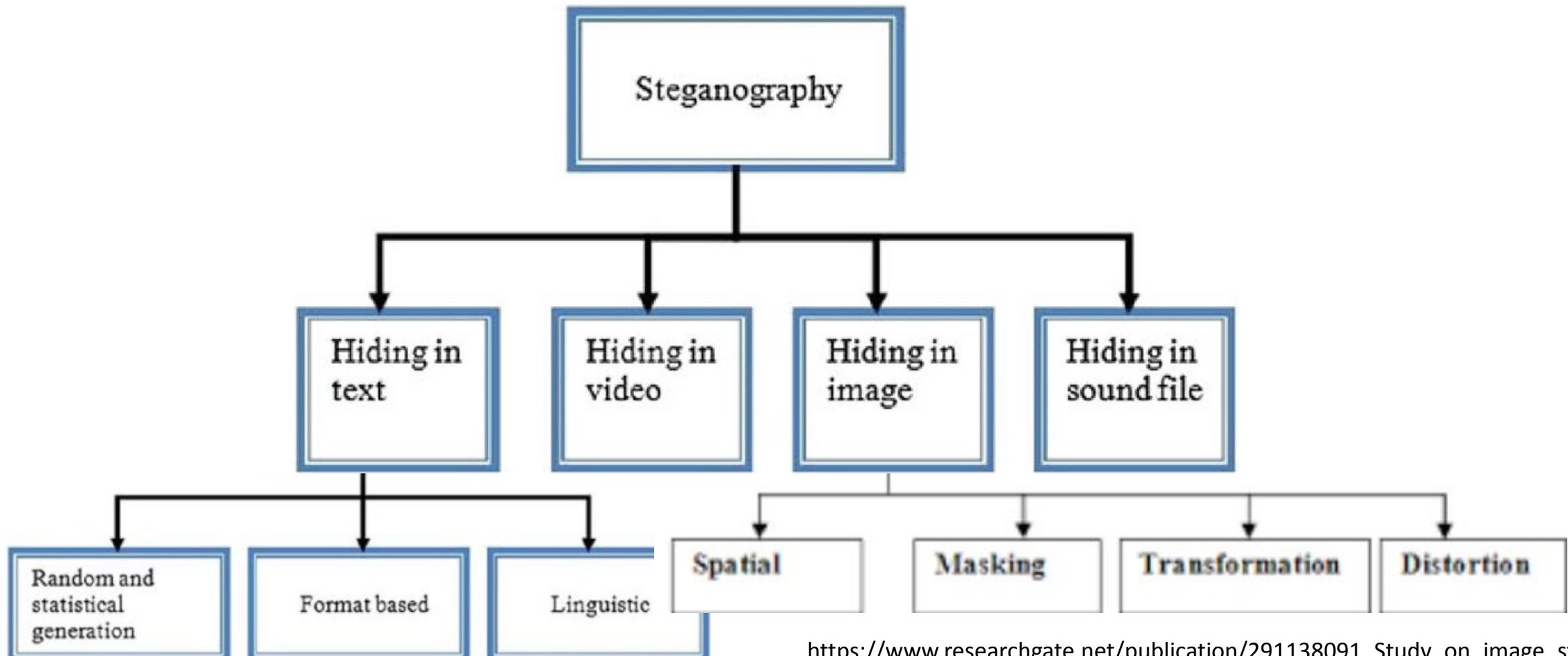


Yup, it is **Steganography**!

Covered or
concealed

writin
g

Whereas cryptography is the practice of protecting the contents of a message alone, **steganography** is concerned with concealing both the fact that a secret message is being sent *and* its contents.



[https://www.researchgate.net/publication/311772678 AH4S An algorithm of text in text steganography using the structure of omega network](https://www.researchgate.net/publication/311772678_AH4S_An_algorithm_of_text_in_text_steganography_using_the_structure_of_omega_network)

[https://www.researchgate.net/publication/291138091 Study on image steganography techniques](https://www.researchgate.net/publication/291138091_Study_on_image_steganography_techniques)



ini adalah azzam

Result



Binary representation of your message

01101001011011100110010010000001100001011001000110000101101100011000010111010011110100110000101101101



Result S



Choose file download.png

Decode

Hidden message

ini adalah

azzam@xxxxxxxxxxxxxx



*Steganography has its place in security.
It is not intended to replace
cryptography but supplement it. Hiding
a message with steganography methods
reduces the chance of a message being
detected. However, if that message is
also encrypted, if discovered, it must
also be cracked (yet another layer of
protection).*

*(David Kahn, penulis buku *The
Codebreakers - The Story of Secret
Writing*)*



- Computer Security Principles and Practice Third Edition, William Stallings and Lawrie Brown, Pearson, 2012
- Introduction to computer security, Matt Bishop, Addison Wesley, 2005
- Computer Networking: A Top Down Approach 6th edition Jim Kurose, Keith Ross, and Addison-Wesley
- <https://www.ericsson.com/en/blog/2021/7/cryptography-and-privacy-protecting-private-data>
- <https://selembardigital.com/pelajari-semua-tentang-cryptocurrency-kiptografi-bagaimana-cara-kerjanya/>