

## CRYPTOLOGY

# Symmetric Encryption

Today, more and more people are learning and working remotely.

As we work on the internet, it's important to keep our data safe.

**List the kinds of data you would want to keep safe online.**

But how do we do that?

**Let's start with a message:**


J BN B HJSM 4 UFDI

**Can you read it? Why not?**

If you said because it's **encoded** or **encrypted**, you are right!

The pros who use math to create these codes are called **Cryptologists**.

Mastercard uses **keys** to encrypt the information traveling in its network.

Imagine a padlock.  You need a specific **key** to lock and unlock it.

If the same **key** locks and unlocks the message, it is called **symmetric encryption**.

Encryption  
converting  
information into  
a code, especially  
to prevent  
unauthorized  
access

Symmetric  
same parts  
facing each other



## CRYPTOLOGY

# Symmetric Encryption

One example of symmetric encryption is **ROT1 Code**.

You rotate each letter one place.

A becomes B. B becomes C.

ROT 1 code is the **key** that was used to encode our message.

J BN B HJSM 4 UFDI

Can you read it now? What does it say?

Try encoding your own message using ROT1 Code.

See if others can figure it out.

You may have to share the key!

But what if someone finds, figures out or steals your key?  
 Since the same key encrypts and decrypts the information,  
 it's pretty easy to decode.

## ROT 1 CODE

LETTER	WRITTEN AS...
A	B
B	C
C	D
D	E
E	F
F	G
G	H
H	I
I	J
J	K
K	L
L	M
M	N
N	O
O	P
P	Q
Q	R
R	S
S	T
T	U
U	V
V	W
W	X
X	Y
Y	Z
Z	A

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# Tokenization

What if the relationship between data and its encryption was random?

What if there was no predictable pattern?

**Let's look at another message. Can you read this one?**



It says T O K E N I Z A T I O N

This is another form of encryption that can protect your data.

In the example above, each letter is replaced with a token, like an emoji.

What other kinds of random **tokens** can you think of?

Encrypt your own message by creating your own tokens.

Use your imagination to create your tokens in the chart below.

They could be symbols, pictures or even colors!

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	

Encrypt your message here:

Ask others if they can decode your secret message.

Now, if you consider **symmetric encryption** vs. **tokenization**, which seems safer?

Think of a door with a lock. One key to get in and get out? OR multiple keys and multiple locks.

If you chose **Tokenization** as the safer option, you are correct!

**You are a Girls4Tech Cryptologist!**

Tokenization  
the process of  
substituting  
sensitive data with  
a non-sensitive  
"token"

CERTIFICATE OF ACHIEVEMENT

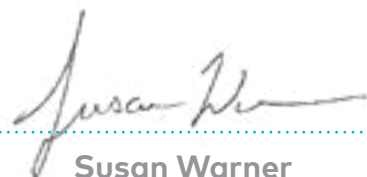
Congratulations!

YOU ARE A CERTIFIED

girls<sup>4</sup>  
tech<sup>TM</sup>  
CRYPTOLOGIST



Michael Miebach  
CEO, Mastercard



Susan Warner  
Founder, Girls4Tech