

# Substitution ciphers (a.k.a mono alphabetic ciphers)

➔ Improvement over Caesar cipher

**Algorithm :** allow an arbitrary permutation of the alphabet

**Key :** set of substitutions

**Key space :**  $26!$  possible substitutions (  $4 \times 10^{26} \sim 89$  bits)

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

if we wish to replace letters

WI RF RWAJ UH YFTSDVF SFUUFYA

# Breaking substitution ciphers