

Problem 1

Plain Alphabet

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Caesar Cipher Alphabet

JKLMNOPQRSTUVWXYZABCDEFGHI

Shift key : 9 (+ve)

Substitute Table

K	R	C	L	X	W	B	N	O	Q	U	E	A
B	I	T	C	O	N	S	E	F	H	L	V	R
V												
M												

Decrypter Text

Bitcoinisoneofthecoolestinventioninrecenttimes

Problem 2

Procedure

1. We sorted the alphabets according to their frequency in the given text. They were sorted in a decreasing order.
2. We know that the letter 'e' and 't' are the most frequent letters in the english language. We substituted 'e' and 't' with the most frequent letters in the text, 'u' and 'v' respectively.
3. Also, the word 'the' is the most frequent word in english language. In the ciphertext, the most frequent word is substituted using (2), which makes substitutions for the letter 'h'.
4. We substituted all the other 2-letter words with prepositions and article 'an' by following the frequency table given below.
5. By guessing the estimated words, we substituted all the other letters in the ciphertext.

Here, the 2nd ciphertext was easier to break since a larger dataset facilitates increased precision.

Ciphertext 1

Decipher text

he was not certain whether the sun shone or for that matter whether it was day or night he was ashamed to ask all the planet seemed to live beneath metal the meal of which he had just

partaken had been labeled luncheon but there were many planets which lived a standard timescale that took no account of the perhaps inconvenient alternation of day and night. the rate of planetary turnings differed, and he did not know that of trantor

Frequencies from Cipher Text (alphabetically):

A	B	C	D	E	F	G	H	I	J	K	L	M
0	4	9	14	8	31	22	6	30	14	19	0	43
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
39	15	1	4	4	7	48	3	0	6	3	8	16

Cipher Text alphabets order corresponding to their frequencies:

T	M	N	F	I	G	K	Z	O	D	J	C	E
48	43	39	31	30	22	19	16	15	14	14	9	8
Y	S	H	W	B	Q	R	U	X	P	A	L	V
8	7	6	6	4	4	4	3	3	1	0	0	0

Substitution Cipher text alphabet:

T	M	I	N	F	G	L	A	V	K	C	J	E
e	t	h	a	n	o				r	w	s	c
O	W	S	U	Q	D	B	X	H	R	Y	P	Z
i	u	m	g	k	l	y	v	p	b	f	J	

Ciphertext 2

Decipher Text

there was a wall ahead it began high in the air and extended upward out of sight it was riddled with holes that were the mouths of gaal wondered idly how his driver could pick out one among so many there was now only blackness with nothing but the past-flashing of a colored signal light to relieve the gloom the air was full of a rushing sound gaal leaned forward against deceleration then and the taxi popped out of the tunnel and descended to ground-level once more the luxor hotel said the driver unnecessarily he helped gaal with his baggage accepted a tenth-credit tip with a businesslike air picked up a waiting passenger and was rising again in all this from the moment of debarkation there had been no glimpse of sky trantor at the beginning of the thirteenth millennium this tendency reached its climax as the center of the imperial government for unbroken hundreds of generations and located as it was toward the central regions of the galaxy among the most densely populated and industrially advanced worlds of

the system, it could scarcely help being the densest and richest clot of humanity the race had ever seen its urbanization, progressing steadily had finally reached the ultimate. all the land surface of trantor square miles in extent was a single city the population at its height was well in excess of forty billions this enormous population was devoted almost entirely to the administrative necessities of empire and found themselves all too few for the complications of the task (it is to be remembered that the impossibility of proper administration of the galactic empire under the uninspired leadership of the later emperors was a considerable factor in the fall) daily fleets of ships in the tens of thousands brought the produce of twenty agricultural worlds to the dinner tables of trantor its dependence upon the outer worlds for food and indeed for all necessities of life made trantor increasingly vulnerable to conquest by siege in the last millennium of the empire the monotonously numerous revolts made emperor after emperor conscious of this and imperial policy became little more than the protection of trantor's delicate jugular vein

Frequencies from Cipher Text (alphabetically):

A	B	C	D	E	F	G	H	I	J	K	L	M
13	49	110	89	141	100	44	129	47	2	41	133	107
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
29	40	24	1	7	133	48	228	171	1	8	83	21

Cipher Text alphabets order corresponding to their frequencies:

U	V	E	L	S	H	C	M	F	D	Y	B	T
228	171	141	133	133	129	110	107	100	89	83	49	48
I	G	K	O	N	P	Z	A	X	R	J	Q	W
47	44	41	40	29	24	21	13	8	7	2	1	1

Substitution Cipher text alphabet:

U	V	D	M	E	N	C	Y	H	L	I	S	B
e	t	h	r	a	w	s	d	n	o	f	i	u
K	O	F	X	T	A	J	P	G	Z	R	W	Q
p	g	l	k	c	v	q	y	m	b	x	j	z

Problem 3:

Vignere Cipher Table:

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
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	a
c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b
d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c
e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d
f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e
g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f
h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g
i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h
j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i
k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j
l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k
m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l
n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m
o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n
p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t
v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
z	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

Given,

Key : 'pinkfloyd'

Original Text : Ethereum is an open-source, public, blockchain-based distributed computing platform and operating system featuring smart contract functionality

Encryption :

1st letter : [p][e] -> t

2nd letter : [i][t] -> b

And so on...

Decryption :

1st letter : Find the column letter of 't' in [p] > e

2nd letter : Find the column letter of b in [i] > t

And so on...