

Introductory Number Theory

Problem: You have intercepted a message to a person with public key (e, n) , where

$$e = 3199957 \quad \text{and} \quad n = 3832716017551$$

The message consists of six blocks:

0182002821959

3092737753574

3397137880489

2339619796630

2916903963593

1986692232044

You know that each block corresponds to a number that encodes four characters of the standard keyboard according to the tables

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15

p	q	r	s	t	u	v	w	x	y	z	A	B	C	D
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

T	U	V	W	X	Y	Z	'	1	2	3	4	5	6	7
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

8	9	0	-	=	~	!	@	#	\$	%	^	&	*	(
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75

)	_	+		,	.	/	<	>	?	;	'	:	"	[
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90

]	{	}												
91	92	93	94											

which follow in principle the method described on page 65 and page 66 of the course notes. Note that the blank has number 79 and the period has number 81. Using computer algebra, decrypt the message by breaking the code. (100 points)

Due date: Wednesday, November 15, 2017. Submit only the decrypted message and a brief qualitative description, in a few sentences without giving explicit numbers, how you broke the code. Normally, your solution should fit on one handwritten page.