



HANU
HANOI UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

HOMEWORK

Discrete Mathematics

TUT-05: Problem Set 05

Release Date: October 7, 2021

Semester: Fall 2021

Problem 1

Find x in the following equations by Euclidean Algorithm: $13x \equiv 1 \pmod{29}$

Problem 2

Find $\gcd(2n + 1, 3n + 2)$, where n is a positive integer.

Problem 3

Find x in the following equations by Extended Euclidean Algorithm: $134x \equiv 1 \pmod{467}$

Problem 4

Find x in the following equations by Extended Euclidean Algorithm: $384x \equiv 1029 \pmod{341}$

Problem 5

Find x in the following equations by Euclidean Algorithm: $384x \equiv 1038 \pmod{2418}$

Problem 6

Find x in the following equations by Euclidean Algorithm: $372x \equiv 183 \pmod{579}$

Problem 7

Find x in the following equations by Euclidean Algorithm: $2013x \equiv 2014 \pmod{2015}$

Problem 8

Find x in the following equation

$$2371x \equiv 1 \pmod{3872}$$

by using Euclidean Algorithm (EA) and Extended Euclidean Algorithm (EEA).

Problem 9

What is the original message encrypted using the RSA system with $p = 5$, $q = 13$ and $e = 11$ and the codes of the encrypted message is 36 35 35. (Student must use the ASCII tables to look up the ASCII codes and find the characters.)

Problem 10

What is the original message encrypted using the RSA system with $p = 5, q = 11$ and $e = 17$ and the codes of the encrypted message is 48 06 07. (Student must use the ASCII tables to look up the ASCII codes and find the characters.)

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	Null	32	20	Space	64	40	@	96	60	`
1	01	Start of heading	33	21	!	65	41	A	97	61	a
2	02	Start of text	34	22	"	66	42	B	98	62	b
3	03	End of text	35	23	#	67	43	C	99	63	c
4	04	End of transmit	36	24	\$	68	44	D	100	64	d
5	05	Enquiry	37	25	%	69	45	E	101	65	e
6	06	Acknowledge	38	26	&	70	46	F	102	66	f
7	07	Audible bell	39	27	'	71	47	G	103	67	g
8	08	Backspace	40	28	(	72	48	H	104	68	h
9	09	Horizontal tab	41	29	)	73	49	I	105	69	i
10	0A	Line feed	42	2A	*	74	4A	J	106	6A	j
11	0B	Vertical tab	43	2B	+	75	4B	K	107	6B	k
12	0C	Form feed	44	2C	,	76	4C	L	108	6C	l
13	0D	Carriage return	45	2D	-	77	4D	M	109	6D	m
14	0E	Shift out	46	2E	.	78	4E	N	110	6E	n
15	0F	Shift in	47	2F	/	79	4F	O	111	6F	o
16	10	Data link escape	48	30	0	80	50	P	112	70	p
17	11	Device control 1	49	31	1	81	51	Q	113	71	q
18	12	Device control 2	50	32	2	82	52	R	114	72	r
19	13	Device control 3	51	33	3	83	53	S	115	73	s
20	14	Device control 4	52	34	4	84	54	T	116	74	t
21	15	Neg. acknowledge	53	35	5	85	55	U	117	75	u
22	16	Synchronous idle	54	36	6	86	56	V	118	76	v
23	17	End trans. block	55	37	7	87	57	W	119	77	w
24	18	Cancel	56	38	8	88	58	X	120	78	x
25	19	End of medium	57	39	9	89	59	Y	121	79	y
26	1A	Substitution	58	3A	:	90	5A	Z	122	7A	z
27	1B	Escape	59	3B	;	91	5B	[	123	7B	{
28	1C	File separator	60	3C	<	92	5C	\	124	7C	|
29	1D	Group separator	61	3D	=	93	5D	]	125	7D	}
30	1E	Record separator	62	3E	>	94	5E	^	126	7E	~
31	1F	Unit separator	63	3F	?	95	5F	_	127	7F	□

(a) Code 0 → 127

Extended ASCII Chart (character codes 128 - 255)											
128	Ç	143	Ë	158	Ê	172	¼	186	¶	200	ℓ
129	ù	144	É	159	ë	173	½	187	§	201	ℓ
130	é	145	æ	160	á	174	¾	188	¶	202	ℓ
131	â	146	Æ	161	í	175	»	189	¶	203	ℓ
132	à	147	ó	162	ó	176	¼	190	¶	204	ℓ
133	à	148	ö	163	ú	177	½	191	¶	205	ℓ
134	ä	149	ò	164	ñ	178	¾	192	¶	206	ℓ
135	ç	150	û	165	Ñ	179	¼	193	¶	207	ℓ
136	ê	151	ù	166	²	180	½	194	¶	208	ℓ
137	ë	152	ÿ	167	³	181	¾	195	¶	209	ℓ
138	è	153	Ö	168	¿	182	¼	196	¶	210	ℓ
139	ì	154	Ü	169	¬	183	½	197	¶	211	ℓ
140	í	155	õ	170	¬	184	¾	198	¶	212	ℓ
141	î	156	£	171	½	185	¼	199	¶	213	ℓ
142	ä	157	¥							214	ℓ
										215	ℓ
										216	ℓ
										217	ℓ
										218	ℓ
										219	ℓ
										220	ℓ
										221	ℓ
										222	ℓ
										223	ℓ
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										225	ℓ
										226	ℓ
										227	ℓ
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										249	ℓ
										250	ℓ
										251	ℓ
										252	ℓ
										253	ℓ
										254	ℓ
										255	ℓ

(b) Code 128 → 255

Figure 1: ASCII Tables

References

- [1] K. H. Rosen, *Discrete Mathematics and Its Applications*, McGraw-Hill, 7th edition, 2011.
- [2] S. S. Epp, *Discrete Mathematics with Applications*, Cengage-Learning, 4th edition, 2010.
- [3] T. W. Judson and R. A. Beezer, *Abstract Algebra: Theory and Applications*, Free Software Foundation, 2017, [Online; accessed 08-September-2017].