

~~CONFIDENTIAL~~

NATIONAL SECURITY AGENCY
Washington 25, D. C.

COURSE

Military Cryptanalysis, Part I

LESSON 8

Monalphabetic substitution with
irregular-length cipher units:
monome-dinome systems and others

TEXT ASSIGNMENT

Section X

1. Solve the following monome-dinome cryptogram and recover the original matrix:

78131	76784	31174	50078	76343	47807
41346	53334	01331	01799	78318	76441
31917	92478	74179	10834	76033	55723
40178	31347	46554	65323	41305	86131
34767	30345	77787	48763	77689	76072
76747	88123	11278	31788	76503	47753
17807	67921	07276	07310	17997	88878
74703	05323	15777	71034	76371	33764
47117	37607	88390	00666	33300	03985
79531	31533	78342	47800	17230	75560
34850	74547	83189			

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

2. The following monome-dinome cryptogram is believed to contain the probable word "DIVISION". Solve the text and recover the original matrix:

1 7 8 3 2	0 0 0 6 6	1 6 9 2 7	8 0 6 3 5	2 8 4 2 0	0 4 5 9 6
9 5 2 2 0	0 1 9 0 0	2 1 5 0 0	4 0 5 6 3	2 6 7 4 6	1 2 5 7 6
8 0 7 0 5	8 8 1 2 3	5 3 9 2 1	3 1 1 1 8	1 3 2 8 1	2 9 1 5 9
4 6 4 6 5	6 1 5 7 6	5 2 8 4 4	9 0 0 3 3	9 4 5 2 6	5 9 4 0 0
2 5 2 8 4	3 0 0 3 2	0 0 4 5 7	8 0 7 5 8	8 0 7 0 7	0 0 5 2 6
7 3 9 4 1	2 0 8 5 4	5 6 6 4 0	5 9 3 5 2	9 1 6 2 5	9 7 6 1 2
4 6 9 7 7	8 9 1 2 5	0 5 9 4 5	2 2 0 0 8	4 1 4 0 1	5 1 1 2 9
3 1 7 0 2	9 1 0 6 7	5 3 7 6 3	5 9 0 6 2	3 8 0 7 1	6 7 0 0 3
8 4 6 7 0	0 4 2 6 7	7 8 5 7 2	2 0 0 8 4	1 7 9 1 9	6 0 2 6 6
4 3 5 9 5	6 5 6 9 7	0 0 0 3 6	1 2 0 0 4	9 7 6 1 6	8 7 2 0 2
6 0 0 4 5	7 0 7 8 7	0 5 9 7 1	2 6 1 2 2	8 1 2 0 0	1 9 0 0 3
0 0 8 4 1	7 6 9 1 2	0 9 5 9 9	7 2 6 7 3		

3. The following cryptogram was intercepted on a link which has been known to be passing traffic in two different monome-dinome systems, one involving a matrix of the type shown in Fig. 75 of the text, the other involving a matrix of the type in Fig. 77. Solve the text of the message and recover the original matrix.

4 7 6 3 1	8 2 8 7 0	1 4 6 2 8	3 1 2 7 4	1 2 7 4 1	1 6 2 6 3
1 6 0 5 4	6 3 1 5 2	8 4 6 6 2	6 0 7 3 6	9 7 7 2 8	4 6 1 9 8
4 6 9 7 2	1 3 8 0 8	4 6 2 8 7	4 6 3 6 4	8 3 7 8 8	7 2 8 4 6
6 0 8 4 6	2 8 7 3 8	2 7 5 7 8	8 7 0 7 3	1 8 2 7 9	6 2 7 3 6
9 7 4 6 2	8 3 1 0 7	3 6 9 7 7	4 5 6 3 6	2 6 9 6 2	7 3 1 6 8
6 2 7 6 3	1 2 1 3 8	0 8 4 6 2	8 7 3 1 6	0 6 3 7 9	8 2 6 4 7
2 8 4 6 7					

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

4. The following messages, intercepted on a link known to be passing monome-dinome traffic, are believed to be isologs. Solve the texts and recover the original matrices.

Message "A"

9 4 8 7 2	3 3 9 3 5	6 1 2 2 7	8 9 3 1 6	2 3 4 0 5	0 9 0 7 9
4 3 8 1 0	5 7 6 7 8	9 3 3 8 6	4 1 9 9 9	8 3 8 0 9	0 8 3 3 4
9 4 1 9 4	7 6 2 7 9	9 9 4 9 6	3 0 5 7 6	7 9 1 9 9	5 4 3 4 3
5 7 6 8 3	0 4 1 8 6	0 7 9 8 1	4 3 3 4 9	8 3 5 2 9	0 9 6 3 8

Message "B"

9 4 3 7 8	1 1 9 3 5	6 2 8 8 7	3 9 3 2 6	8 1 4 0 5	0 9 0 7 9
4 1 3 2 0	5 7 6 7 3	9 3 1 3 6	4 1 9 9 9	8 1 3 0 9	0 3 1 1 4
9 4 1 9 4	7 6 8 7 9	9 9 4 9 6	1 0 5 7 6	7 9 1 9 9	5 4 3 4 3
5 7 6 3 1	0 4 1 3 6	0 7 9 8 2	4 3 1 4 9	3 1 5 8 9	0 9 6 1 3

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

5. The following messages are believed to be isologous monome-dinome ciphers. Solve the texts and recover the original matrices:

Message "A"

7 3 5 0 7	0 9 8 8 5	0 1 6 5 2	3 7 5 3 1	0 9 8 0 4	3 9 8 5 8
1 4 9 8 3	1 2 3 1 6	5 2 3 7 1	1 2 8 9 0	9 3 3 1 2	4 2 6 8 9
3 0 7 4 1	5 9 0 1 2	5 4 3 9 8	5 0 5 6 3	9 8 4 6 0	7 7 2 9 7
3 0 4 1 5	6 5 0 7 5	4 3 0 9 8	1 3 5 0 0	7 4 3 7 9	0 6 8 1 4
5 1 9 8 3	1 2 3 1 6	5 2 3 7 1	1 3 5 5 9	3 3 1 2 4	3 9 8 4 2
1 6 3 6 1	8 0 7 7 2	9 7 0 5 6	2 9 0 9 2	5 8 1 4 5	1 5 4 6 5
0 7 9 0 1	1 0 1 2 1	9 8 6 1 7	5 6 3 9 8	9 4 1 6 3	8 4 7 3 1
3 5 0 3 9	0 4 3 9 8				

Message "B"

3 6 7 1 3	4 5 8 0 7	1 8 9 2 1	6 3 8 6 7	5 5 4 0 6	5 8 1 7 9
5 6 2 9 6	8 9 2 1 6	3 7 7 9 8	0 7 4 8 5	6 2 9 0 9	1 8 0 8 5
4 3 0 7 2	7 4 2 9 2	5 6 5 7 1	8 4 6 5 0	1 4 3 3 9	7 3 6 4 0
7 2 1 7 1	3 2 5 6 4	5 8 8 7 1	4 3 0 6 3	7 4 1 8 0	7 9 8 7 5
6 2 9 6 8	9 2 1 6 3	7 7 6 7 6	8 5 6 2 9	0 6 5 0 9	8 9 6 1 2
3 4 3 3 9	7 3 4 8 4	9 7 4 2 4	8 1 7 9 8	7 2 5 1 7	1 3 7 4 7
7 4 2 9 2	7 8 0 1 7	0 8 4 6 5	2 6 8 9 6	8 0 0 3 6	8 8 7 1 6
7 4 0 6 5					

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

6. Solve the following monome-dinome-trinome cryptogram and recover the original matrix:

6 1 7 4 5	0 4 1 2 0	4 3 9 5 0	4 3 2 3 8	6 5 3 3 2	0 6 3 8 2
0 1 5 0 3	2 0 6 8 2	6 1 6 6 1	2 0 4 3 6	5 3 5 1 3	1 7 1 5 0
6 8 4 1 2	1 9 2 0 3	1 6 2 0 4	3 8 5 4 3	1 2 0 4 3	2 0 1 5 0
3 5 3 5 0	1 2 3 3 5	4 5 0 3 9	4 4 1 7 1	2 0 1 8 6	5 0 9 2 9
7 8 5 0 9	2 3 8 5 0	4 6 2 0 4	8 4 7 3 9	4 5 0 4 9	6 2 0 6 5
8 2 8 2 0	4 3 5 3 2	0 1 5 6 1	9 3 2 3 1	6 5 1 8 4	7 1 5 3 3
5 3 8 4 2	0 4 5 4 1	6 2 4 5 3	3 2 0 4 3	8 5 4 2 1	6 8 5 6 4

7. Solve the following uniliteral-biliteral cryptogram, and recover all keys:

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

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

8. The following cryptogram, enciphered in a Playfair-type digraphic-monographic system, is suspected to begin with the probable stereotype "MORNING REPORT FOR MONDAY NOVEMBER TWENTY FIRST." Solve the text and recover all keys.

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

9. The following cryptogram was enciphered in a dinome-trinome digraphic system employing matrices similar to those in Figs. 90a and b, except that the internal numerical sequences have been changed. The message is suspected to end with the signature VINCENT ANDERSEN COL INF. Solve the text and reconstruct the matrices involved.

7 1 6 6 5 7 3 3 3 0 1 3 4 9 2 2 5 2 2 1 3 9 2 2 5 8 6 7 6 5
 0 1 8 0 2 6 0 9 4 0 4 4 2 6 3 1 2 5 1 4 4 7 3 0 3 6 0 7 3 3
 9 6 1 0 4 7 0 2 7 3 7 2 0 2 7 5 3 0 7 2 8 5 7 3 5 3 9 5 1 8
 4 2 3 0 1 0 7 8 2 4 2 2 1 3 2 7 1 9 2 3 5 1 9 0 3 5 1 6 6 3
 9 2 5 6 9 0 9 4 0 2 7 8 7 0 9 4 0 3 5 3 0 1 0 7 8 2 1 9 4 6
 9 5 7 5 5 8 5 9 6 2 4 2 2 1 3 2 7 1 9 7 6 5 1 8 7 2 6 7 5 2
 7 4 0 9 7 5 5 7 3 4 8 6 9 1 9 6 1 1 8 2 8 1 0 5 1 0 2 7 1 9
 8 5 1 9 6 5 7 3 9 2 2 0 0 8 5 3 2 5 3 6 7 5 1 7 1 9 2 5 7 7
 6 3 4 9 4 3 5 2 3 4 4 5 0 6 7 1 9 3 4 9 2 2 5 2 2 0 4 7 1 4
 4 1 0 4 5 2 2 2 1 6 5 7 5 0 8 7 7 5 3 7 1 6 2 2 3 9 3 1 4 4
 2 4 5 8 6 3 4 9 4 4 8 2 5 0 6

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

10. The following cryptogram, based on a Morse code system, is suspected to begin with a spelled-out number. Solve it and recover all keys:

7 1 4 3 0 6 2 8 0 9 1 8 5 9 2 3 5 6 0 7 6 1 5 7 2 0 4 9 5 3
7 9 0 1 2 8 7 5 4 8 6 5 9 8 3 0 4 0 3 7 9 5 3 2 7 3 0 7 5 1
3 4 9 0 4 5 6 5 6 4 2 0 8 1 3 0 1 2 5 8 1 6 4 0 8 9 7 1 5 6
6 4 5 9 7 6 0 4 1 0 8 3 1 5 9 3 4 7 0 2 6 8 0 3 2 9 5 3 5 7
2 5 1 7 3 0 2 5 8 9 4 1 5 8 2 6 0 3 6 0 9 1 7 5 4

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

(BLANK)

~~CONFIDENTIAL~~