DOI: 10.24996/ijs.2019.60.3.22

ISSN: 0067-2904

Secret-Word by e-Abacus Diagram I

Awreng B. Mahmood[1*], Ammar S. Mahmood[2]
[1]Department of Mathematics, College of Sciences, University of Salahaddin, Iraq
[2]Department of Mathematics, University of Mosul, College of Education for pure science

Abstract
This experiment may be applied before with certain and special roles, but never applied under partition theory (Abacus James Diagram) conditions. Therefore, we would have to find an appropriate design for each character to enable us sending a word represented as increasing number with meaning only for beneficiaries.

Keywords: Partition Number, Abacus James Diagram.

الكلمة السرية بأستخدام مخطط اباكس جيمس e

أورنك بايز محمود[1]*، عمار صديق محمود[2]
[1] الرياضيات،العلوم ، صلاح الدين ، آربيل ، العراق
[2] الرياضيات،التربية للعلوم الصرفة ،الموصل، نينوى ، العراق

الخلاصة
قد تكون هذه التجربةجربت من قبل وفق قواعد معينة وخاصة. لكنها لم تجرب إطلاقا وفق شروط و خصائص نظرية التجزئة. لذا كان علينا إيجاد التصميم المناسب لكل حرف ليتسنى لنا لاحقا إرسال جملة وكأنها أرقام تصاعدية لا معنى لها إلا عند المستفيدين منها.

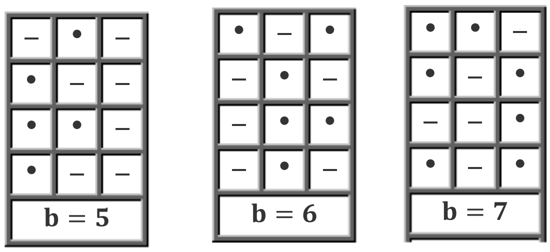
1. Introduction

The idea of this work was came when terrorist groups took over the city of Mosul. The idea of needing a way to send (coded messages) to other people without being detected by the terrorist grow bigger and bigger. The partition theory has a big role as there is no past research in this domain being the regulator to code (or Secret –Word) a word. We would like to mention that [1] was to study the code subject by using an (unknown) language to many, which is the Syriac language (that resemble the Arabic language by having merged letters and each letter three ways to written depending on its position in the word, in the beginning, middle and the end of the words) and this idea with different vision than what is found in this paper. Let n be a positive integer. A composition of n is a sequence $\mu = (\mu_1, \mu_2, \dots)$ of non-negative integers such that $|\mu| = \sum_i \mu_i = n$. The integers μ_i for $i \geq 1$ are the parts of μ if $\mu_i = 0$ for $i > r$, we identify μ with $(\mu_1, \mu_2, \dots, \mu_r)$. A composition μ is a partition if $\mu_j \geq \mu_{j+1}$, for all $j \geq 1$. We write $\mu \vDash n$ and $\mu \vdash n$ if μ is a composition and μ is a partition of n respectively, [2]. Let σ be the number of redundant part of the partition μ of n, then we have $\mu = (\mu_1, \mu_2, \mu_3, \dots, \mu_r) = (\lambda_1^{\sigma_1}, \lambda_2^{\sigma_2}, \dots, \lambda_m^{\sigma_m})$ such that $|\mu| = n = \sum_{i=1}^{r} \mu_i = \sum_{k=1}^{m} \lambda_k^{\sigma_k}$,[3]. An e-Abacus is a Chinese Abacus with e vertical runners, labeled $0, 1, 2, 3, \dots, e-1$ from left to right. We label the positions on the abacus $0, 1, 2, \dots$ from left to right, top to bottom.

*Email: awring2002@yahoo.com

run.1	run.2	run.3	…	run.e
0	1	2	…	$e-1$
e	$e+1$	$e-2$	…	$2e-1$
$2e$	$2e+1$	$2e+2$	…	$3e-1$
.	.	.	…	...

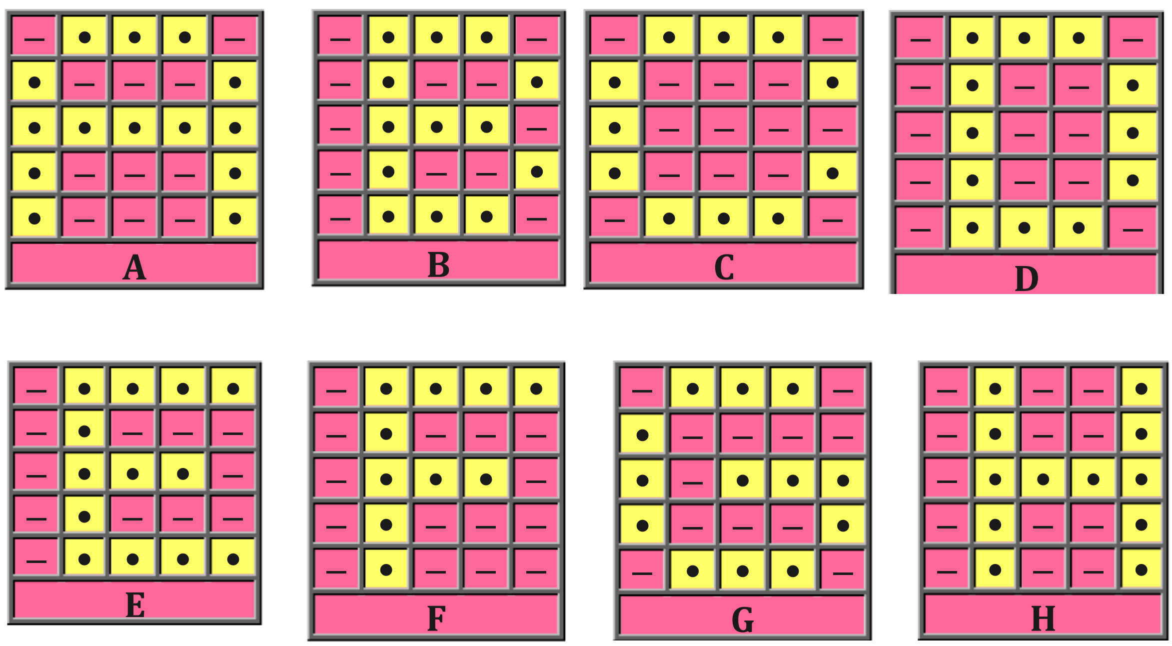
James in [3], defined β-numbers by fix μ as a partition of n, choose an integer b greater than or equal to the number of parts r of μ and define $\beta_i = \mu_i + b - i, 1 \le i \le b$.The set $\beta_1, \beta_2, \dots, \beta_b$ is said to be a set of β-numbers for μ. He will represent β-numbers by □ and any number is not appear by $-$ in each any runners depending on e.
Example: if $\mu = (5,4,4,2,1)$, then $n = 16$, $r = 5$ and we can take $b \ge 5$. If $b = 5, 6$ and 7, then β-numbers are $\{9,7,6,3,1\}$, $\{10,8,7,4,2,0\}$ and $\{11,9,8,5,3,1,0\}$ respectively. If $e = 3$ then we have:

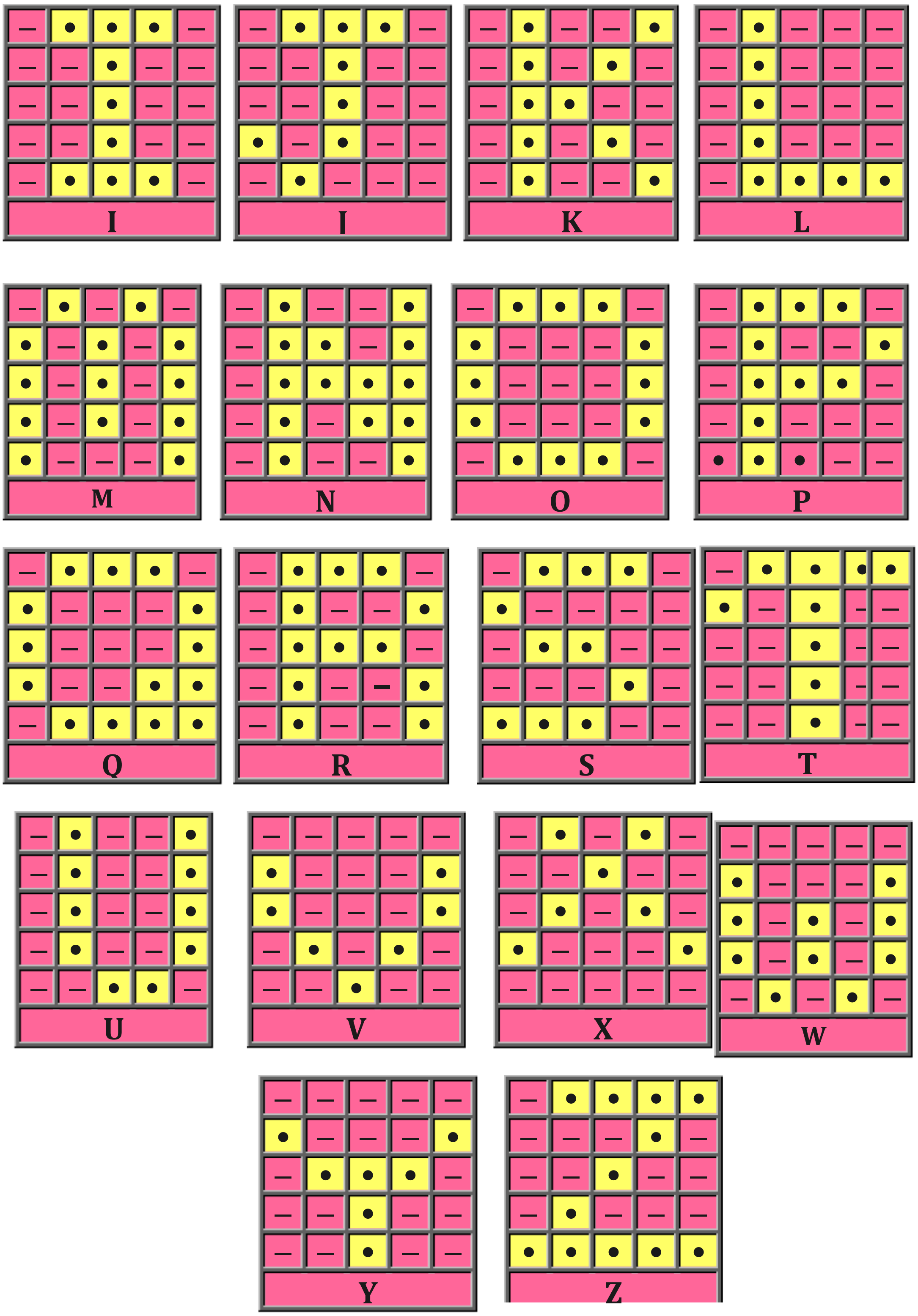


Mahmood in [4] defined the following: For any Abacus James diagram and β-numbers, the values of $b = r, r+1, \dots, r+(e-1)$, are called the "guides" where r is the number of parts of the partition μ of n. We will define any Abacus James diagram that corresponds any b guide, as a "Main diagram" or "Guide diagram".

2. Partition Theory of the Words

The aim of the study is to investigate of the new ways for sending secret words via communication devices that help us to transfer messages secretly. In this section we include encrypt of specific English letters using main Abacus James diagram. After many choose of e of Abacus James Diagram we found:





Here is a list of the partition number for each letter i.e. (for each first main- Abacus James diagram).

Letters	Partition	Letters	Partition
A	$(11,8^2,5^7,2,1^3)$	**B**	$(11^3,10,8,6^3,5,3,1^3)$
C	$(13^3,12,9,5^2,2,1^3)$	**D**	$(12^3,11,9,8,6,5,3,1^3)$
E	$(11^5,7, 5^3, 1^5)$	**F**	$(6,10,6, 5^4, 1^5)$
G	$(11^3,10,7^4,6,2,1^3)$	**H**	$(13,11,10,8,7^4,6,4,3,1)$
I	$(15^3,12,8,4,1^3)$	**J**	$(14,11,10,8,4,1^3)$
K	$(15,13,11,10,7^2,5,4,3,1)$	**L**	$(17^4,13,9,5,1)$
M	$(12,9^2,8,7^2,6,5^2,4,3,2,1)$	**N**	$(11,9,8^2,7,6^4,5,4^2,3,1)$
O	$(12^3,11,8^2,5^2,2,1^3)$	**P**	$(11^3,8,6^3,5,3,1^3)$
Q	$(11^4,10^2,8^2,5^2,2,1^3)$	**R**	$(13,11,10,8,6^3,5,3,1^3)$
S	$(13^3,12,7^2,2,1^3)$	**T**	$(14,10,6,2,1^5)$
U	$(14^2,12,10,9,7,6,4,3,1)$	**V**	$(16,13,12,11,8^2,5)$
W	$(14,13,12,11,10^2,9,8^2,5)$	**X**	$(13,10,9,8,5,2,1)$
Y	$(16,12,9^3,8,5)$	**Z**	$(13^5,10,7,4,1^4)$

Figure 2.1

3. Creation a Word Consists of Many Letters

After the design has been installed the model of each character and specified the partition for each character as previously indicated, we want to create a word of at least two letters, because the word of unique one letter is used the same partition of this letter. Here is the mechanism to create a word consisting of only two characters.

Run.1	Run.2	Run.3	Run.4	Run.5
0	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24

Run.1	Run.2	Run.3	Run.4	Run.5
0	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24

Run. 1	Run. 2	Run. 3	Run. 4	Run. 5	Run. 6	Run. 7	Run. 8	Run. 9	Run
0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49

In this work, we need to write the partition sequence by $\mu = (\mu_r, \mu_{r-1}, \dots, \mu_2, \mu_1)$ because this step had a major effect in how to find the partition of any word(and letter on any text). The process of reassembling the partition will make it easier to read each row of the five chosen for each figure.

Let $\mathbf{PL}^*$ $(\boldsymbol{i})_{\boldsymbol{j}}$ be the partition of letter with respect (*) of 5 (five) positions in each row k in (i) the number of letter and (j) the number of row and $\mathbf{b}_{\mathbf{ks}}$ the number of beads in (k) of rows and (s) the number of columns.

Rule (3. 1): The general rule of secret - word for two letters is defined by:

Row	Letter (1)	Letter (2)
(1)	$PL^*(1)_1$	$PL^*(2)_1 + (5 - b_{11})$
(2)	$PL^*(1)_2 + (5 - \sum b_{ks})$ Where $\{k = 1 \wedge s = 2\}$	$PL^*(2)_2 + (5(2) - \sum b_{ks})$ Where $\{k = 1, 2 \wedge s = 1\}$
(3)	$PL^*(1)_3 + (5(2) - \sum b_{ks})$ Where $\{k = 1, 2 \wedge s = 2\}$	$PL^*(2)_3 + (5(3) - \sum b_{ks})$ Where $\{k = 1, 2, 3 \wedge s = 1\}$
(4)	$PL^*(1)_4 + (5(3) - \sum b_{ks})$ Where $\{k = 1, 2, 3 \wedge s = 2\}$	$PL^*(2)_4 + (5(4) - \sum b_{ks})$ Where $\{k = 1, \dots, 4 \wedge s = 1\}$
(5)	$PL^*(1)_5 + (5(4) - \sum b_{ks})$ Where $\{k = 1, 2, 3, 4 \wedge s = 2\}$	$PL^*(2)_5 + (5(5) - \sum b_{ks})$ Where $\{k = 1, \dots, 5 \wedge s = 1\}$

Figure 3.1

Proof

	Letter (1)	Letter (2)
(1)	is very clear	$PL^*(2)_1$ plus five positions of 1^{st} row of letter(1) minus all the beads in 1^{st} row of letter(1)
(2)	$PL^*(1)_2$ plus five positions of 1^{st} row of letter(2) minus all the beads in 1^{st} row of letter(2)	$PL^*(2)_2$ plus 10 positions of 1^{st} and 2^{nd} rows of letter(1) minus all the beads in 1^{st} and 2^{nd} rows of letter(1)
(3)	$PL^*(1)_3$ plus 10 positions of 1^{st} and 2^{nd} rows of letter(2) minus all the beads in 1^{st} and 2^{nd} rows of letter(2)	$PL^*(2)_3$ plus 15 positions of 1^{st} to 3^{ed} rows of letter(1) minus all the beads in 1^{st} to 3^{ed} rows of letter(1)
(4)	$PL^*(1)_4$ plus 15 positions of 1^{st} to 3^{ed} rows of letter(2) minus all the beads in 1^{st} to 3^{th} rows of letter(2)	$PL^*(2)_4$ plus 20 positions of 1^{st} to 4^{th} rows of letter(1) minus all the beads in 1^{st} to 4^{th} rows of letter(1)
(5)	$PL^*(1)_5$ plus 20 positions of 1^{st} to 4^{th} rows of letter(2) minus all the beads in 1^{st} to 4^{th} rows of letter(2)	$PL^*(2)_5$ plus 25 positions of 1^{st} to 5^{th} rows of letter(1) minus all the beads in 1^{st} to 5^{th} rows of letter(1)

For example, the word **AS** is

Run.1	Run.2	Run.3	Run.4	Run.5
1	●	●	●	2
●	3	4	5	●
●	●	●	●	●
●	6	7	8	●
●	9	10	11	●
A: $(1^3, 2, 5^7, 8^2, 11)$				

Run.1	Run.2	Run.3	Run.4	Run.5
1	●	●	●	2
●	3	4	5	6
7	●	●	8	9
10	11	12	●	13
●	●	●	14	15
S: $(1^3, 2, 7^2, 12, 13^3)$				

Run.1	Run.2	Run.3	Run.4	Run.5	Run.6	Run.7	Run.8	Run.9	Run.10
1	•	•	•	2	3	•	•	•	4
•	5	6	7	•	•	8	9	10	11
•	•	•	•	•	12	•	•	13	14
•	15	16	17	•	18	19	20	•	21
•	22	23	24	•	•	•	•	25	26
AS: $(1^3, 3^3, 4, 7^2, 11^5, 12^2, 14, 17, 20, 21, , 24^4)$									

Then secret-word of AS *is* $(1^3, 3^3, 4, 7^2, 11^5, 12^2, 14,17,20,21, 24^4$

	Letter (A)	Letter (S)
(1)	$PL^*(A)_1 = 1^3$	$PL^*(S)_1 = 1^3, b = 3 \Longrightarrow$ $(1 + (5-3))^3 = 3^3$
(2)	$PL^*(A)_2 = \{2 \text{ and } 5\}, b = 3 \Longrightarrow$ $2 + (5-3) = 4$ and $5 + (5-3) = 7$	$PL^*(S)_2 = 2, b = 5 \Longrightarrow$ $2 + (10-5) = 7$
(3)	$PL^*(A)_3 = 5^5, b = 4 \Longrightarrow$ $(5 + (10-4))^5 = 11^5$	$PL^*(S)_3 = 7^2, b = 10 \Longrightarrow$ $(7 + (15-10))^2 = 12^2$
(4)	$PL^*(A)_4 = \{5 \text{ and } 8\}, b = 6 \Longrightarrow$ $5 + (15-6) = 14$ and $8 + (15-6) = 17$	$PL^*(S)_4 = 12, b = 12 \Longrightarrow$ $12 + (20-12) = 20$
(5)	$PL^*(A)_5 = \{8 \text{ and } 11\}, b = 7 \Longrightarrow$ $8 + (20-7) = 21$ and $11 + (20-7) = 24$	$PL^*(S)_5 = 13^3, b = 14 \Longrightarrow$ $(13 + (25-14))^3 = 24^3$

Rule (3. 2): The general rule of secret - word for two letters is defined by

	Letter (1)	Letter (2)	Letter (3)
(1)	$PL^*(1)_1$	$PL^*(2)_1 + (5 - b_{11})$	$PL^*(3)_1 + (5(2) - \sum b_{ks}), \left\{ \begin{matrix} k = 1 \\ s = 1, 2 \end{matrix} \right\}$
(2)	$PL^*(1)_2 + (5(2) - \sum b_{ks}), \left\{ \begin{matrix} k = 1 \\ s = 2, 3 \end{matrix} \right\}$	$PL^*(2)_2 + (5(3) - \sum b_{ks}), \left\{ \begin{matrix} k = 1 \ \wedge \ s = 1, 3 \\ k = 2 \ \wedge \ s = 1 \end{matrix} \right\}$	$PL^*(3)_2 + (5(4) - \sum b_{ks}), \{k = 1, 2 \ \wedge \ s = 1, 2\}$
(3)	$PL^*(1)_3 + (5(4) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2 \\ s = 2, 3 \end{matrix} \right\}$	$PL^*(2)_3 + (5(5) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2 \ \wedge \ s = 1, 3 \\ k = 3 \ \wedge \ s = 1 \end{matrix} \right\}$	$PL^*(3)_3 + (5(6) - \sum b_{ks}), \{k = 1, 2, 3 \ \wedge \ s = 1, 2\}$
(4)	$PL^*(1)_4 + (5(6) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2, 3 \\ s = 2, 3 \end{matrix} \right\}$	$PL^*(2)_4 + (5(7) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2, 3 \ \wedge \ s = 1, 3 \\ k = 4 \ \wedge \ s = 1 \end{matrix} \right\}$	$PL^*(3)_4 + (5(8) - \sum b_{ks}), \{k = 1, \dots, 4 \ \wedge \ s = 1, 2\}$
(5)	$PL^*(1)_5 + (5(8) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2, 3, 4 \\ s = 2, 3 \end{matrix} \right\}$	$PL^*(2)_5 + (5(9) - \sum b_{ks}), \left\{ \begin{matrix} k = 1, 2, 3, 4 \ \wedge \ s = 1, 3 \\ k = 5 \ \wedge s = 1 \end{matrix} \right\}$	$PL^*(3)_5 + (5(10) - \sum b_{ks}), \{k = 1, \dots, 5 \ \wedge \ s = 1, 2\}$

Figure 3.2

	Letter (1)	Letter (2)	Letter (3)
(1)	is very clear of $PL^{*}(1)_1$	$PL^{*}(2)_1$ plus five positions of 1^{st} row of letter(1)minus all the beads in 1^{st}row of letter(1).	$PL^{*}(3)_1$ plus 10 positions of 1^{st} row of letter(1)and letter(2)minus all the beads in (1^{st}row of letter(1)and letter(2)).
(2)	$PL^{*}(1)_2$ plus 10 positions of 1^{st} row of letter(2)and letter(3)minus all the beads in (1^{st}row of letter(2)and letter(3)).	$PL^{*}(2)_2$ plus 10 positions of 1^{st} row of letter(1)and letter(3)and 2^{nd}row of letter(1) minus all the beads in (1^{st}row of letter(1) and letter(3),and 2^{nd}row of letter(1))	$PL^{*}(3)_2$ plus 20 positions of 1^{st} and 2^{nd}rows of letter(1)and letter(2)minus all the beads in (1^{st} and 2^{nd}rows of letter(1)and letter(2)) .
(3)	$PL^{*}(1)_3$ plus 20 positions of 1^{st} and 2^{nd}rows of letter(2)and letter(3)minus all the beads in (1^{st} and 2^{nd}rows of letter(2)and letter(3)).	$PL^{*}(2)_3$ plus 25 positions of (1^{st} and 2^{nd} rows of letter(1)and letter(3) ,and3^{ed}row of letter(1) minus all the beads in (1^{st} and 2^{nd} rows of letter(1)and letter(3),and 3^{ed} row of letter(1)).	$PL^{*}(3)_3$ plus 30 positions of (1^{st} to 3^{ed}rows of letter(1)and letter(2))minus all the beads in (1^{st} to 3^{ed}rows of letter(1)and letter(2)) .
(4)	$PL^{*}(1)_4$ plus 30 positions of (1^{st} to 3^{ed}rows of letter(2)and letter(3))minus all the beads in (1^{st} to 3^{ed}rows of letter(2)and letter(3)) .	$PL^{*}(2)_4$ plus 35 positions of (1^{st} to 3^{ed}rows of letter(1)and letter(3) and 4^{th}row of letter(1))minus all the beads in (1^{st} to 3^{ed}rows of letter(1)and letter(3) and 4^{th}rows of letter(1)) .	$PL^{*}(3)_4$ plus 40 positions of (1^{st} to 4^{th}rows of letter(1)and letter(2))minus all the beads in (1^{st} to 4^{th}rows of letter(1)and letter(2)) .
(5)	$PL^{*}(1)_5$ plus 40 positions of (1^{st} to 4^{th}rows of letter(2)and letter(3))minus all the beads in (1^{st} to 4^{th}rows of letter(2)and letter(3)) .	$PL^{*}(2)_5$ plus 45 positions of (1^{st} to 4^{th}rows of letter(1)and letter(3) and 5^{th}row of letter(1))minus all the beads in (1^{st} to 4^{th}rows of letter(1)and letter(3) and 5^{th}rows of letter(1)) .	$PL^{*}(3)_5$ plus 50 positions of 1^{st} to 5^{th}rows of letter(1)and letter(2)minus all the beads in (1^{st} to 5^{th}rows of letter(1)and letter(2))

For example, the word $\boldsymbol{WAY}$ is:

Run.1	Run.2	Run.3	Run.4	Run.5	Run.6	Run.7	Run.8	Run.9	Run.10	Run.11	Run.12	Run.13	Run.14	Run.15
1	2	3	4	5	6	●	●	●	7	8	9	10	11	12
●	13	14	15	●	●	16	17	18	●	●	19	20	21	●
●	22	●	23	●	●	●	●	●	●	24	●	●	●	25
●	26	●	27	●	●	28	29	30	●	31	32	●	33	34
35	●	36	●	37	●	38	39	40	●	41	42	●	43	44
WAY: $(6^3, 12, 15^2, 18^2, 21^2, 22, 23^6, 24^3, 25, 26, 27^2, 30, 32, 35, 36, 37, 40, 42)$														

By using the Rule (3. 2), we have

W:$(PL^*(W)_1 = 0$,
$PL^*(W)_2 = \{5 \text{ and } 8\}$, $PL^*(W)_3 = \{8, 9 \text{ and } 10\}$, $PL^*(W)_4 = \{10, 11 \text{ and } 12\}$, $PL^*(W)_5 = \{13 \text{ and } 14\})$

A:$(PL^*(A)_1 = 1^3$, $PL^*(A)_2 = \{2 \text{ and } 5\}$, $PL^*(A)_3 = 5^5$, $PL^*(A)_4 = \{5 \text{ and } 8\}$, $PL^*(A)_5 = \{8 \text{ and } 11\})$

Y: $(PL^*(Y)_1 = 0$, $PL^*(Y)_2 = \{5 \text{ and } 8\}$, $PL^*(Y)_3 = 9^3$, $PL^*(Y)_4 = 12$, $PL^*(Y)_5 = 16)$.

Then **WAY** by secret-word is

$(6^3, 12, 15^2, 18^2, 21^2, 22, 23^6, 24^3, 25, 26, 27^2, 30, 32, 35, 36, 37, 40, 42)$

	Letter (W)	Letter (A)	Letter (Y)
(1)	$PL^*(W)_1 = 0$	$PL^*(A)_2 = 1^3$, $b = 0 \Longrightarrow$ $(1 + (5 - 0))^3 = 6^3$	$PL^*(Y)_1 = 0$, $b = 3 \Longrightarrow$ $(0 + (10 - 3)) = 7$
(2)	$PL^*(W)_2 = \{5 \text{ and } 8\}$, $b = 3 \Longrightarrow$ $5 + (10 - 3) = 12$ and $8 + (10 - 3) = 15$	$PL^*(A)_2 = \{2 \text{ and } 5\}$, $b = 3 \Longrightarrow$ $2 + (15 - 2) = 15$ and $5 + (15 - 3) = 18$	$PL^*(Y)_2 = \{5 \text{ and } 8\}$, $b = 7 \Longrightarrow$ $5 + (20 - 7) = 18$ and $8 + (20 - 7) = 21$
(3)	$PL^*(W)_3 = \{8, 9 \text{ and } 10\}$, $b = 7 \Longrightarrow$ $8 + (20 - 7) = 21$, $9 + (20 - 7) = 22$ and $10 + (20 - 7) = 23$	$PL^*(A)_3 = 5^5$, $b = 4 \Longrightarrow$ $(5 + (25 - 7))^5 = 23^5$	$PL^*(Y)_3 = 9^3$, $b = 15 \Longrightarrow$ $(9 + (30 - 15))^3 = 24^3$
(4)	$PL^*(W)_4 = \{10, 11 \text{ and } 12\}$, $b = 15 \Longrightarrow$ $10 + (30 - 15) = 25$, $11 + (30 - 15) = 26$ and $12 + (30 - 15) = 27$	$PL^*(A)_4 = \{5 \text{ and } 8\}$, $b = 13 \Longrightarrow$ $5 + (35 - 13) = 27$ and $8 + (35 - 13) = 30$	$PL^*(Y)_4 = 12$, $b = 20 \Longrightarrow$ $12 + (40 - 20) = 32$
(5)	$PL^*(W)_5 = \{13 \text{ and } 14\}$, $b = 18 \Longrightarrow$ $13 + (40 - 18) = 35$ and $14 + (40 - 18) = 36$	$PL^*(A)_5 = \{8 \text{ and } 11\}$, $b = 16 \Longrightarrow$ $8 + (45 - 16) = 37$ and $11 + (45 - 16) = 40$	$PL^*(Y)_5 = 16$, $b = 24 \Longrightarrow$ $16 + (50 - 24) = 42$

Now, if we take a word with greater than or equal to four letters, we have the same results and we have the general rule:

Rule (3. 3): The general rule of secret-word with any number of letters is defined by:

	Letter (1)	Letter (2)	…	Letter $(\tau-1)$	Letter (τ)
Row (1)	$PL^*(1)_1$	$PL^*(2)_1+(5-b_{11})$	…	$PL^*(\tau-1)_1+(5(\tau-2)-\sum b_{ks})$,$\{k=1 \wedge s=1,2,\dots,\tau-2\}$	$PL^*(\tau)_1+(5(\tau-1)-\sum b_{ks})$,$\{k=1 \wedge s=1,2,\dots,\tau-1\}$
Row (2)	$PL^*(1)_2+(5(\tau-1)-\sum b_{ks})$ $\{k=1 \wedge s=2,3,\dots,\tau\}$	$PL^*(2)_2+(5(\tau)-\sum b_{ks})$, $\begin{cases} k=1 \wedge s=1,3,4,\dots \\ k=2 \wedge s=1 \end{cases}$	…	$PL^*(\tau-1)_2+(5(2\tau-3)-\sum b_{ks})$, $\begin{cases} k=1 \wedge s=1,2,\dots,\tau-2,\tau \\ k=2 \wedge s=1,2,\dots,\tau-2 \end{cases}$	$PL^*(\tau)_2+(5(2\tau-2)-\sum b_{ks})$, $\{k=1,2 \wedge s=1,2$
Row (3)	$PL^*(1)_3+(5(2\tau-2)-\sum b_{ks})$, $\{k=1,2 \wedge s=2,3,\dots$	$PL^*(2)_3+(5(2\tau-1)-\sum b_{ks})$ $\begin{cases} k=1,2 \wedge s=1,3,4, \\ k=3 \wedge s=1 \end{cases}$	…	$PL^*(\tau-1)_2+(5(3\tau-4)-\sum b_{ks})$, $\begin{cases} k=1,2 \wedge s=1,2,\dots,\tau-2 \\ k=3 \wedge s=1,2,\dots,\tau-2 \end{cases}$	$PL^*(\tau)_3+(5(3\tau-3)-\sum b_{ks})$, $\{k=1,2,3 \wedge s=1$
Row (4)	$PL^*(1)_4+(5(3\tau-3)-\sum b_{ks})$, $\{k=1,2,3 \wedge s=2,3,$	$PL^*(2)_4+(5(3\tau-2)-\sum b_{ks})$,$\begin{cases} k=1,2,3 \wedge s=1,3 \\ k=4 \wedge s=1 \end{cases}$	…	$PL^*(\tau-1)_2+(5(4\tau-5)-\sum b_{ks})$, $\begin{cases} k=1,2,3 \wedge s=1,2,\dots,\tau- \\ k=4 \wedge s=1,2,\dots,\tau-2 \end{cases}$	$PL^*(\tau)_4+(5(4\tau-4)-\sum b_{ks})$, $\{k=1,\dots,4 \wedge s=$
Row (5)	$PL^*(1)_5+(5(4\tau-4)-\sum b_{ks})$, $\{k=1,2,3,4 \wedge s=2,$	$PL^*(2)_5+(5(4\tau-3)-\sum b_{ks})$,$\begin{cases} k=1,2,3,4 \wedge s=1 \\ k=5 \wedge s=1 \end{cases}$	…	$PL^*(\tau-1)_2+(5(5\tau-6)-\sum b_{ks})$, $\begin{cases} k=1,2,\dots,\tau-2,\tau \wedge s=1, \\ k=5 \wedge s=1,2,\dots, \end{cases}$	$PL^*(\tau)_2+(5(5\tau-5)-\sum b_{ks})$, $\{k=1,\dots,5 \wedge s=$

Figure (3.3)

Proof: The same prove of the rule (3.1) and (3.2) by adding many of letters with five columns.

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