MysteryTwister C3

THE CRYPTO CHALLENGE CONTEST

The Syllabary Cipher – Part 4

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The Syllabary Cipher

Syllabary Cipher

	1	2	3	4	5	6	7	8	9	0
1	A	1	AL	AN	AND	AR	ARE	AS	AT	ATE
2	ATI	B	2	BE	C	3	CA	CE	CO	COM
3	D	4	DA	DE	E	5	EA	ED	EN	ENT
4	ER	ERE	ERS	ES	EST	F	6	G	7	H
5	8	HAS	HE	I	9	IN	ING	ION	IS	IT
6	IVE	J	0	K	L	LA	LE	M	ME	N
7	ND	NE	NT	O	OF	ON	OR	OU	P	Q
8	R	RA	RE	RED	RES	RI	RO	S	SE	SH
9	ST	STO	T	TE	TED	TER	TH	THE	THI	THR
0	TI	TO	U	V	VE	W	WE	X	Y	Z

100%

Figure: Screenshot of the Syllabary Cipher component of CrypTool 2 showing the original English Syllabary table as presented in "Military Cryptanalytics Part 1"

Introduction (1/3) – The Cipher

The **Syllabary cipher** is a monoalphabetic substitution cipher, which uses a 10x10 lookup table. The table consists of single letters and the most frequent syllables of the language. It also contains all digits from 0 to 9. The digits left of the rows and on top of the columns define the ciphertext symbols.

In the previous shown table, the "A" is encrypted by "11," the "1" by "12", the "AL" by "13", etc.

More details can be found in [1, 2]. You can test the cipher in CrypTool 2 [3].

Introduction (2/3) – Different Keying Schemes

There are three different ways how to apply keys with this cipher:

1. An unknown digit key[1] is used for rows and column indices, but the table content is known.
2. An unknown table keyword[1] is used to permute the table, but the digit key is known.
3. Both, the digit key and the table keyword are unknown.

[1] see page 5

Introduction (3/3) – How to Apply Keys

Digit keys: Let's assume our digit key is "9876543210123456789 0". In this case, we would write "9876543210" on top of the columns and "1234567890" left of the rows. We only use each digit exactly once for the columns and exactly once for the rows.

Keyword: Let's assume our keyword is "SECRETKEY". In this case, we would fill into the table (from left to right and top to bottom) the elements "SE", "C", "RE", "T", "K", "E", "Y" and then the remaining elements of the original (English) table. We always use the original (English) table as baseline for the table generation. Clearly, we only use each key element once and omit elements we already used.

Challenge

This is the **fourth challenge** in a series of **five challenges** with the Syllabary cipher.

With this challenge, we provide a **ciphertext with 910 digits**.

Neither, the digit key nor the keyword to permute the table are known:

- Digit key: **(unknown!)**
- Keyword: **(unknown!)**

To solve the challenge, you have to provide the first 51 characters of the plaintext in uppercase letters.

Resources

→ `Ciphertext4.txt`: The ciphertext with 910 digits.

References

1. William F. Frederick and Lambros D. Callimahos: **Military Cryptanalytics Part 1** (1959)
2. K. Schmeh: **Can you break the crypto-number-table challenge?** scienceblogs.de/klausis-krypto-kolumne/2018/09/01/can-you-break-the-crypto-number-table-challenge (2018)
3. **CrypTool 2**: www.cryptool.org/de/ct2/downloads