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# MYSTERYTWISTER

THE CRYPTO CHALLENGE CONTEST

## The Fialka Challenge – Part 3

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## The Fialka machine



FIGURE 1: The Fialka cipher machine, photo with courtesy of [enigmamuseum.com](https://enigmamuseum.com)

Fialka was an electro-mechanical rotor cipher machine used by the USSR during the Cold War. Like Enigma, it had rotors and a reflector. There were ten rotors, and the plugboard was replaced with a punchcard reader that could effect a full permutation of the alphabet. The alphabet that it used was a subset of the Russian one and had thirty letters.

An excellent and thorough description of the machine can be found in the linked document by Paul Reuvers and Marc Simons [1].

There is also a simulator for Windows available: [2]

## The challenge

A piece of English text was taken, and all punctuation was removed so that only the 30 distinct letters and spaces remained.

The letters were converted to Cyrillic according to the Polish version of the Fialka keyboard, and spaces to Ё. There are no digits in the plaintext.

The result was encrypted with rotors from Series 3K and the following key:

- daily key:  
БДКЕВ ЗАЖИГ  
ЛГБШИ ПЙЫЯЮ  
ВБГДЖ ЗАИЕК  
21222 11211  
ШЦТФЩ ЯБМЧЫ
- message key: АГЗИЖ БДЕКВ
- damaged punchcard: see Fig. 2

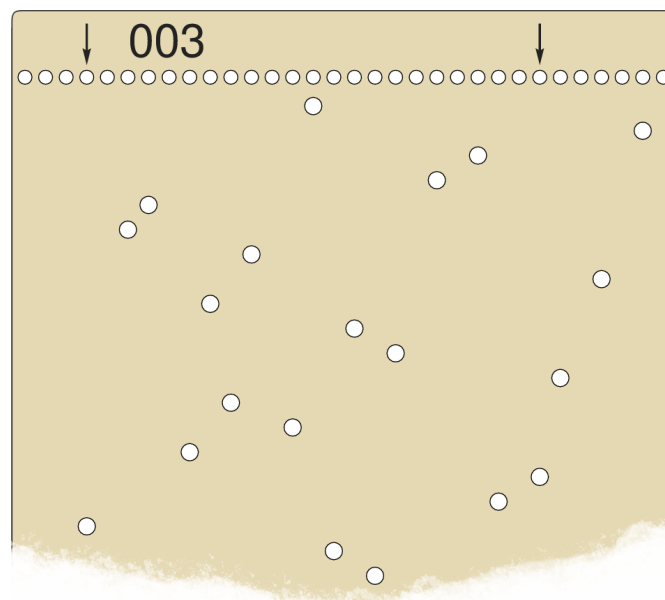


FIGURE 2: Fialka damaged key punchcard

Attached to this challenge are the Cyrillic and English ciphertexts.

The former contains the encrypted text in Cyrillic, and the latter contains the same text in English

letters and digits (according to the same Polish keyboard).

## Your task

Your task is to reconstruct the punchcard and find its alphabetic permutation, as taken in the direction from the keyboard toward the rotor bank.

Please submit them in their English / digit equivalents without any spaces, according to the Polish keyboard. Your answer should contain thirty different characters.

## Additional files

- [ciphertext3-cyrillic.txt](#) – Original ciphertext in Cyrillic
- [ciphertext3-engl.txt](#) – Ciphertext in English, according to the Polish keyboard
- [fialka3-punchcard-torn.png](#) – The damaged punchcard used for encryption

## References

- [1] Reuvers, P. & Simons, M.: [Documentation on the fialka cryptomuseum.com](#)  
[2] cryptomuseum.com: [Fialka simulator](#)