FYSE 1280 Fall 2025

*Breaking The Code: The Enigma of Alan Turing*

# Assignment 7

For Monday, September 29

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## *Reading*

Read Chapters 6 – 8: "Cryptology From Caesar To Turing," "The Enigma Machine," and "War Years" in *Simply Turing.*

## *Exercises*

1. Create a Vigenère encipherment of the phrase **THE MAN WHO KNEW TOO MUCH; ALAN TURING AND THE INVENTION OF THE COMPUTER** using the keyword **MUNROE**. Carry out the process by hand, showing all the steps. You can check your answer using our *VIGENERE* program.

**2.** A plaintext dispatch about the possible increase of United States military levels mentions the word *FORCES* 8 times. If the dispatch is enciphered using the Vigenère scheme with a keyword of length 6, discuss why it will be possible for a cryptanalyst –who originally doesn't know the length of the keyword) – to determine that length. What if *FORCES* only occurs 7 times? 6 times?

3. Because of the relatively flat character frequency distribution, it is thought that a particular ciphertext was created using a Vigenère scheme. The strings *KGOJPM, OJPMAD,* and *GOJPMA* each occurred several times in the ciphertext. The distances between these occurrences are given in this table:

| | | | | |
|---|---|---|---|---|
| *KGOJPM* | (2)(7)(19) | (7)(7)17) | (3) (7)(7) | (2)(3)(5)(7) |
| *OJPMAD* | (2)(7)(19) | (7)(7)17) | (3) (7)(7) | (2)(3)(5)(7) |
| *GOJPMA* | (2)(7)(19) | (7)(7)17) | | |

What do you think is the most likely number of letters in the keyword?