

Assignment 15
For Wednesday, October 22



Theo A. van Hengel

October 7, 1875 –January 25, 1939



Hugo Alexander Koch

March 9, 1870– 3 March 3, 1928

Van Hengel and **Rudolf Pieter Cornelis Spengler** (January 4, 1875 – March 10, 1955) invented the first rotor based encryption machine but the patent to Hugo Koch Karl de Leeuw, “**The Dutch Invention Of The Rotor Machine**, 1915-1923,” *Cryptologia*, Volume 1 (2003), Issue 1, 73-94.

Reading

Read Jack Copeland’s piece “Enigma” which takes up pages 217 – 264 in *The Essential Turing*.

Writing: Continue to work on Essay 2.

Problems

1. Find a one-to-one correspondence between the set of natural numbers and the positive whole number powers of 10.
2. Find a one-to-one correspondence between the set of natural numbers and the whole number powers of 100.
3. Find a one-to-one correspondence between the set A of reciprocals of the positive integers and the set B consisting of 0 and the reciprocals of the positive integers.
4. Find a one-to-one correspondence between the numbers in the closed interval $[0,1]$ and the open interval $(0,1)$. Notation: the open interval (a,b) is the set of numbers x such that $a < x < b$; it excludes both a and b .
5. Find a one-to-one correspondence between the numbers in the closed interval $[0,1]$ and the numbers in the closed interval $[3,8]$. A word on notation: the *closed interval* $[a,b]$ is the set of numbers x such that $a \leq x \leq b$; it includes the numbers a and b .