Objectives. In this tutorial you should familiarize yourself with the `Magma` Computational Algebra System, learn to create and manipulate strings in `Magma` and to define and work with basic cryptographic constructs available in `Magma`.

1. *Magma overview:* Read over and work through the document "Introduction to Magma for Cryptography". You should become familiar with assignment (`:=`) in `Magma`, the concepts of parents and elements, with basic constructions of integers, rationals, strings in `Magma`, and with standard operators.

2. For each of the intrinsic functions

    `RandomSubstitutionKey`, `StripEncoding`, and `SubstitutionEnciphering`,

    type the function name followed by a semicolon at the prompt. The information displayed is called the signature of the function. What are the components of this information, and what does it tell you?

3. Create the string in `Magma`

    "I am standing up at the water's edge in my dream"

    and assign it to the variable W. Next apply the function `StripEncoding` to W and reassign W to be the output. What is the encoded plaintext that you obtain?

4. Define K to be the output of `RandomSubstitutionKey`. What is your key? Using K and W, use the function `SubstitutionEnciphering` to find the encipher W with respect to the key K. What is the ciphertext for W?

5. Show that the deciphering map with respect to K is also a simple substitution. What is the inverse substitution key with respect to your particular K? Verify this by creating the inverse key and enciphering the ciphertext with respect to it.