1. Alice returns home and finds the door to her apartment open. Mallory broke in while she was away.
   1. What security goals could have been violated? Explain.
   2. Name security mechanisms from different classes that Alice could deploy to protect her belongings
2. How large is the key space for
   1. ROT13?
   2. The vigenere cipher with a known key length of n?
   3. AES with a 256 bit key?
   4. A monoalphabetic substitution cipher with k letters?
3. Alice uses a XOR cipher to send messages to Bob. She sends two messages C1 = M1 ⊕ K and C2 = M2 ⊕ K. Eve captures both ciphertext messages, but mixes up their order. Fortunately, Eve also knows M2, one of the plaintext. How can Eve recover the correct M1 and is it also possible to retrieve the exact key K used by Alice?