# **Part 3: Computer**

***Use any code you have written, and write any new code you wish, but no internet use is allowed.***

**Use the 59 character alphabet shown below for these questions (note the space after the comma):**

**AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz.!?, ;:**

1. **Encode “I feel good and calm like a robot would!” using an affine digraph cipher with   
   a = 612, b = 280.**
2. **Decode “,ORwB,W,pbZOSugHG,jp!:egjA!YtuSOKnE:KwMw AP,!:egFe” which was encoded using an affine digraph cipher with a = 85, b = 1817.**
3. **Encode “I feel like a...contradiction!” with a Hill Cipher using matrix .**
4. **Decode “V:gJknRJ:ckNMJlLSgiso,KWQq??,kR .T” which was encoded using a Hill Cipher with matrix .**
5. **Examine the following ciphertext. You know the plaintext begins “I dreamed” (note the space). What was the full original plaintext and encoding matrix?**

**V:,VMCmwmpuE.ZRJ,sPX;IJK?ttvnpJqECHoqeUfsmzxNqldAiHoF,UQNvTLBUECnpmp.:MqDzpWuEpKkNMJRJ,sPX;IQq;Iin**

**For the final question, assume you are working with an alphabet length of 89 characters, NOT the alphabet given above.**

1. **Imagine an extended Hill cipher that is constructed by encoding the plaintext with the matrix**   **and then with the matrix**  **and then with the matrix**  **and so on, for ten encryption steps.**

**Either determine the single decryption matrix that would produce the same results, or prove that there isn’t one.**